RED HAT TECH UPDATE APRIL 2018

Peter Gustafsson
Solutions Architect
Red Hat Sweden

Johan Odell
Solutions Architect
Red Hat Sweden

Johan Robinson
Specialist Solutions Architect - Storage
Red Hat EMEA

AGENDA

Red Hat Tech Update

- Red Hat Satellite 6.3 New Features
- Gluster Storage
- Ceph Storage
- RHHI
- ~~Red Hat CloudForms 4.6~~

The DEMO-environment is proudly brought to you by

Red Hat Satellite 6.3 New Features

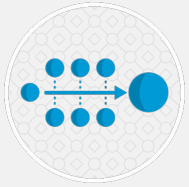
Key Focus Areas

Content management

Supportability

System provisioning

Security & user access



Configuration management

Usability

PACKAGING

SIMPLIFIED PRICING AND PACKAGING

Get the most out of your Red Hat infrastructure investment

OLD MODEL

RED HAT® SATELLITE

Purchase each of the following:

- Red Hat Satellite Server
- Red Hat Satellite Capsule Server
- Smart Management Add-On

RED HAT® INSIGHTS

Purchase the following separately:

- Red Hat Insights Add-On

NEW MODEL

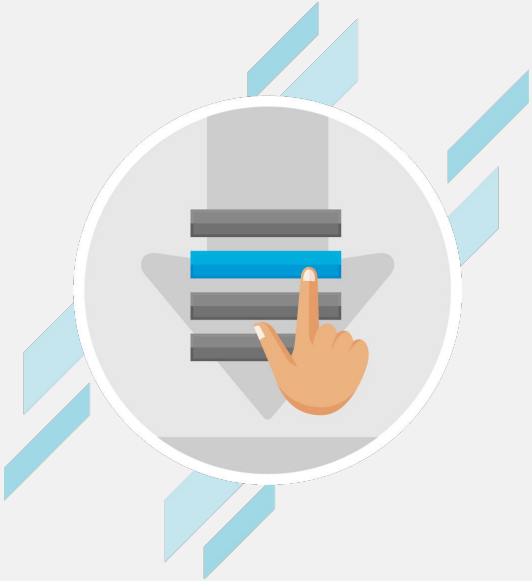
RED HAT® SATELLITE + RED HAT® INSIGHTS

Receive all Satellite and Insights elements (servers & clients) with the purchase of Smart Management

CONTENT MANAGEMENT

IMPROVED CONTENT DOWNLOAD POLICIES AND SYNCHRONIZATION

Better control over download policies using Lazy Sync



Lazy Sync Modes:
All modes applicable to the Red Hat Satellite Server and Red Hat Satellite Capsule Servers. Capsules can now set a content download policy independent of the Satellite settings.

On demand (default)
Retrieves content only when systems request it.

Background
Allows repositories to be published and made available to systems while the content downloads asynchronously.

Immediate
Downloads all content before publishing the repository.

Feature Overview: https://access.redhat.com/articles/3358671

CUSTOM FILE-TYPE REPOSITORIES

Unify the delivery of managed content

NEW FEATURE

Create repositories containing custom file types with new repository management tooling and import those repositories into Red Hat Satellite.

Version management

Custom file types can be added to content views and versioned similar to other content types (RPMs, ISOs, etc).

Feature Overview: https://access.redhat.com/articles/3358991

SYSTEM PROVISIONING

PULL TEMPLATES FROM GIT

Improved ability to manage provisioning templates, similar to content versioning

TECH PREVIEW

Manage and Deploy

Edit templates and clone them using GIT branching and versioning, or any version control system.

Feature Overview: https://access.redhat.com/articles/3358761

CONFIGURATION MANAGEMENT

SATELLITE AND ANSIBLE TOWER INTEGRATION

Documented best practices to help optimize use of both products

By integrating Red Hat Satellite with Red Hat Ansible® Tower, administrators can now perform the following functions:

Dynamic inventory
Allows Ansible Tower to use Satellite as a dynamic inventory source.

Provisioning callbacks
Allows systems provisioned via Satellite to “callback” to Ansible Tower so that playbook runs can happen post-provisioning.

Feature Overview: https://access.redhat.com/articles/3359731

SUPPORTABILITY

PLATFORM SUPPORTABILITY ENHANCEMENTS

NEW FEATURES

Puppet 3.8 & 4

Customers have the freedom to use Puppet 4 within Red Hat Satellite in lieu of (or in conjunction with) their existing Puppet 3.8 deployment.
Feature Overview: https://access.redhat.com/articles/3358711

Unified Extensible Firmware Interface support (UEFI)

Provides mechanisms to allow for support of new technologies, improved development, and enhanced customer experience during the time before the operating system loads.

Amazon Web Services (AWS)

AWS EC2 is now a supported platform for Red Hat Satellite & Red Hat Satellite Capsule Server).
Feature Overview: https://access.redhat.com/articles/3358631

SATELLITE AND INSIGHTS INTEGRATION

Deeper integration with Red Hat Insights

By integrating Red Hat Satellite with Red Hat Insights, administrators can now perform the following functions:

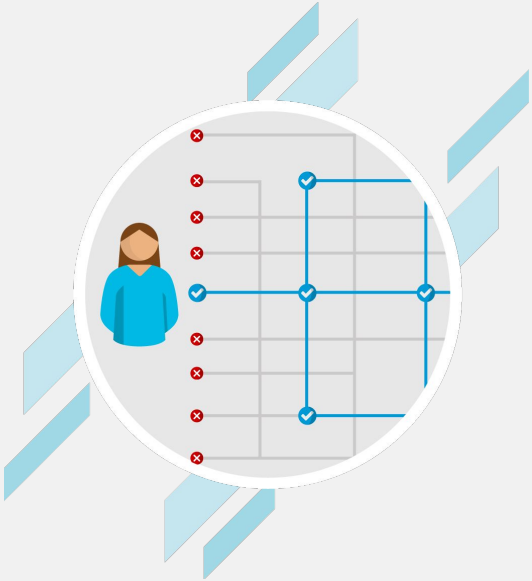
Dashboard Widgets
New widgets for Insights Actions and Insights Risk Summary

Insights Planner
Build out an Insights Planner Playbook for use with Ansible or Ansible Tower from Red Hat Satellite

SECURITY & USER ACCESS

NEW “ORG ADMIN” ROLE

Effectively limit administrator scope within Red Hat Satellite management



NEW FEATURE

The org admin role is intended to scope an administrator such that their reach within the full extent of the Satellite management plane is constrained:

Multi-tenant
No visibility into other organizations. No exposure to the existence of other organizations.

Org admin role
Cannot access existing Satellite users who already assigned other alternative organizations.

Feature Overview: https://access.redhat.com/articles/3359001

redhat.

OPENSCAP TAILORING FILES

Freedom to customize OpenSCAP policy application across systems

NEW FEATURE

Tailoring files

Change the behavior of an existing OpenSCAP policy without having to fork or rewrite the entire policy.

Feature Overview: https://access.redhat.com/articles/3358971

USABILITY

redhat

NOTIFICATION DRAWER

Quick access to occurring events across Red Hat Satellite

NEW FEATURE

Quick Access
Provides fast access to important events

Easy interaction
Gives admins the opportunity to clear or interact with the information provided in the event.

New Functionality
Limited events use the Notification Drawer today. Additional events will move to the notification drawer in the future

Feature Overview: https://access.redhat.com/articles/3358751

FUTURE-DATED SUBSCRIPTIONS

Avoid “red” status by applying subscriptions in advance

NEW FEATURE

Customers can now import purchased Red Hat subscriptions before the actual start date — and allocate them as needed.

Continual coverage

Systems can be configured to have overlap between expiring and new subscriptions, ensuring continual access to content.

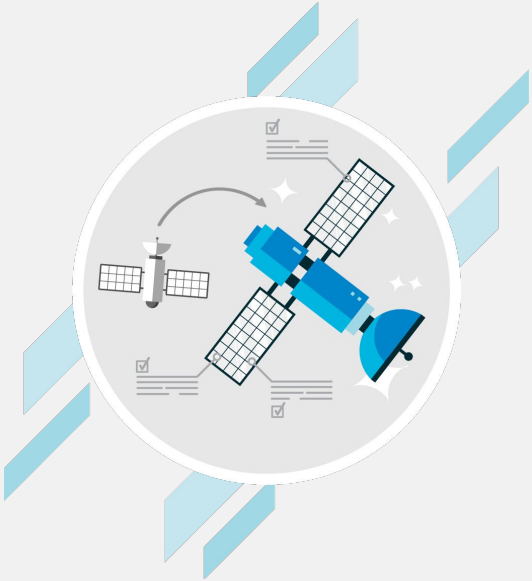
Future-dated subscriptions

Do not provide access to content until their start date.

Feature Overview: https://access.redhat.com/articles/3359011

SATELLITE CLONE

Ability to clone existing Satellite Server to a new host
Provides flexibility with Red Hat product upgrades and migrations



NEW FEATURE

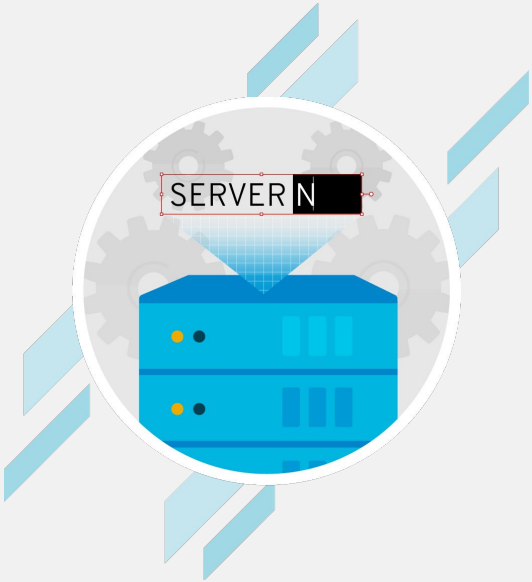
Easy Cloning
Provides a means for the customer to clone their Red Hat Satellite to assist with server migration, or to upgrade from one version of Red Hat Enterprise Linux to another.

Feature Overview: https://access.redhat.com/articles/3359031

redhat.

SATELLITE RENAMING TOOL

Change the Satellite hostname while changing configuration



NEW FEATURE

Automated reconfiguration of the server

Change the hostname of Red Hat Satellite or Red Hat Satellite Capsule Server while updating the various configurations needed to accomplish the change.

Feature Overview: https://access.redhat.com/articles/3359021

redhat.

VIRT-WHO CONFIGURATION WIZARD

Simplified configuration and deployment of virt-who

NEW FEATURE

Easy virt-who configuration

The virt-who wizard aids in running and configuring the virt-who daemon on any Red Hat Enterprise Linux Server being managed by Red Hat Satellite.

Feature Overview: https://access.redhat.com/articles/3358981

NEXT STEPS & RESOURCES

NEXT STEPS

Review all Satellite 6.3 feature overviews and videos:
https://access.redhat.com/blogs/1169563

Use the Upgrade Helper to plan your upgrade-
https://access.redhat.com/labs/satelliteupgradehelper/

Attention Satellite 5 customers:

- End of support for versions 5.7 & below is January 31, 2019 - access to content will not be provided after this date!
  - **Recommended action ASAP: Upgrade to Satellite 5.8** (supported thru May 2020)
  - Consider moving to Satellite 6, when ready

RESOURCES

Red Hat Satellite Product page - http://redhat.com/satellite

Red Hat Satellite Customer Portal - https://access.redhat.com/products/red-hat-satellite

Red Hat Satellite Documentation - https://access.redhat.com/documentation/en-us/red_hat_satellite/

Red Hat Gluster Storage

Red Hat Gluster Storage

RED HAT® GLUSTER STORAGE

TARGET USE CASES

Container Storage
- Persistent storage
- Registry storage

Enterprise File Sharing
- Media streaming
- Active Archives

Enterprise Virtualization

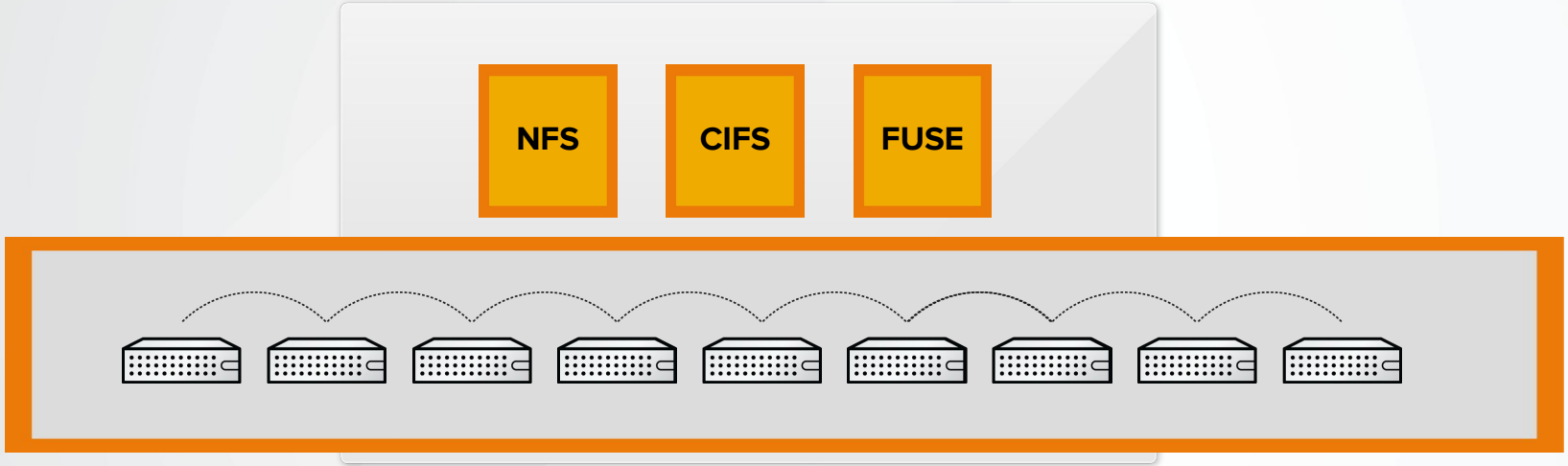
Flexible file storage for petabyte-scale workloads

- Purpose-built as a scale-out file store with a straightforward architecture suitable for public, private, and hybrid cloud
- Simple to install and configure, with a minimal hardware footprint
- Offers mature NFS, SMB and object (Swift) and native glusterfs-fuse interfaces

redhat.

GLUSTER ARCHITECTURE

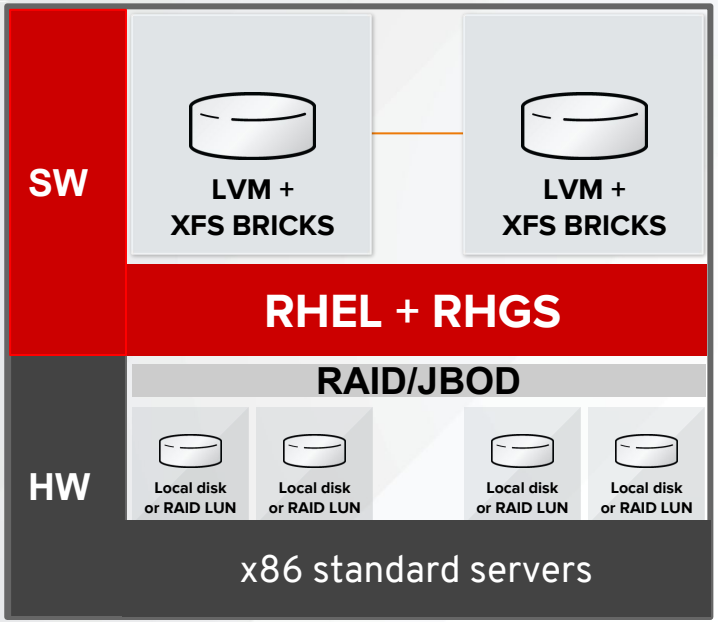
- Distributed scale out share nothing storage using industry standard hardware



Aggregates systems to one cohesive unit and presents using common protocols

redhat.

System anatomy



HW

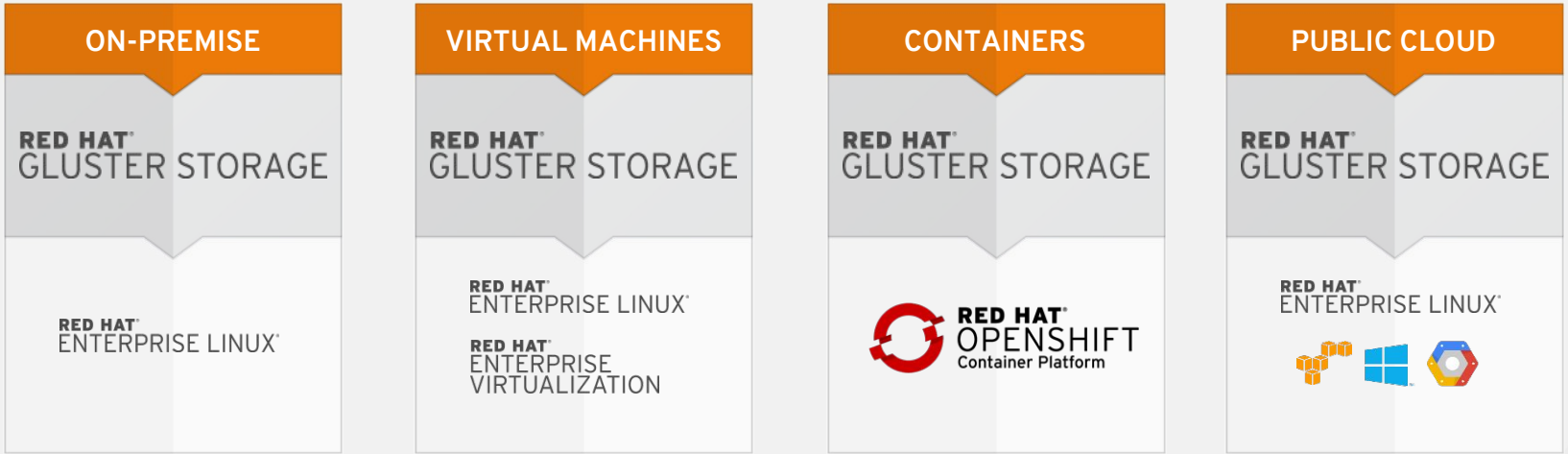
- x86 standard server RHEL certified
- RAID supported RAID6, RAID10, RAID5
- Full Flash SSD and HDD architectures
- Ethernet 10Gb/s, 40Gb/s, Infiniband supported

SW

- Self-healing and data integrity check
- HA with mirroring and data replication
- Native Scale-Out and Scale-Up
- Geo and In-system replication

Flexible Deployment with RHGS

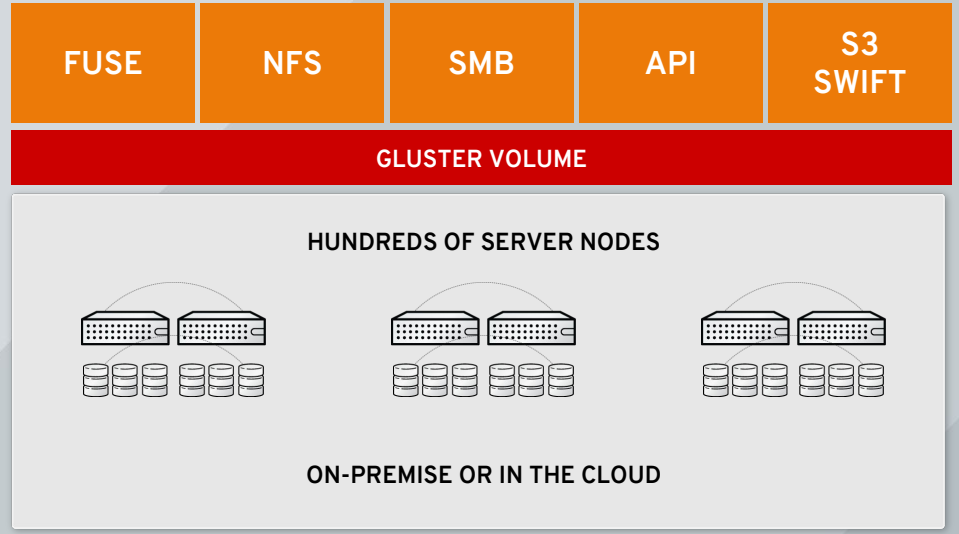
- Same software bits across on-prem, VMs, containers and all three public clouds
- Applications can be ported across deployments without expensive re-writes
- Close integration with RHEL, RHV, and OpenShift



redhat.

MULTI-PROTOCOL ACCESS

Primarily accessed as scale-out file storage with optional APIs, Swift or S3 object

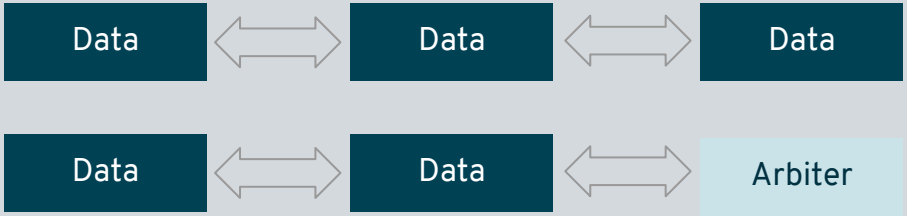


Red Hat Gluster Storage
What's new...

ARBITER VOLUMES

Cost effective alternative to 3-way replication

- **REDUCTION IN FOOTPRINT & TCO**
  Huge capacity savings
- **COST-EFFECTIVE DATA INTEGRITY**
  Integrity of 3-way w/o 3x capacity
- **MULTIPLE DEPLOYMENT MODELS**
  Dedicated or Daisy chained
- **USE CASES**
  Backup/archiving, HCI, Stretched clusters



- **ERASURE CODING VOLUME ENHANCEMENTS**
  The following new variants are now supported:

- 10 bricks with redundancy level 2 (8 + 2)
- 20 bricks with redundancy level 4 (16 + 4)

(in addition to the already supported 4+2, 8+3 and 8+4 configurations)

- # PERFORMANCE IMPROVEMENTS

“*find*” command on a volume improved when BitRot detection is used

Parallel readdirp support
readdirp fops are sent parallelly to all the bricks. This enhances the performance for find and a recursive listing of small directories.

Enhancement to glusterfind command
provides a query sub command that provides a list of changed files

- **NFS GANESHA**

  Dynamic update of export configuration options

  Most NFS-Ganesha export configuration options can be updated dynamically during normal operation without needing to export and re-export the volume.

- **GEO REPLICATION STATUS CMD**

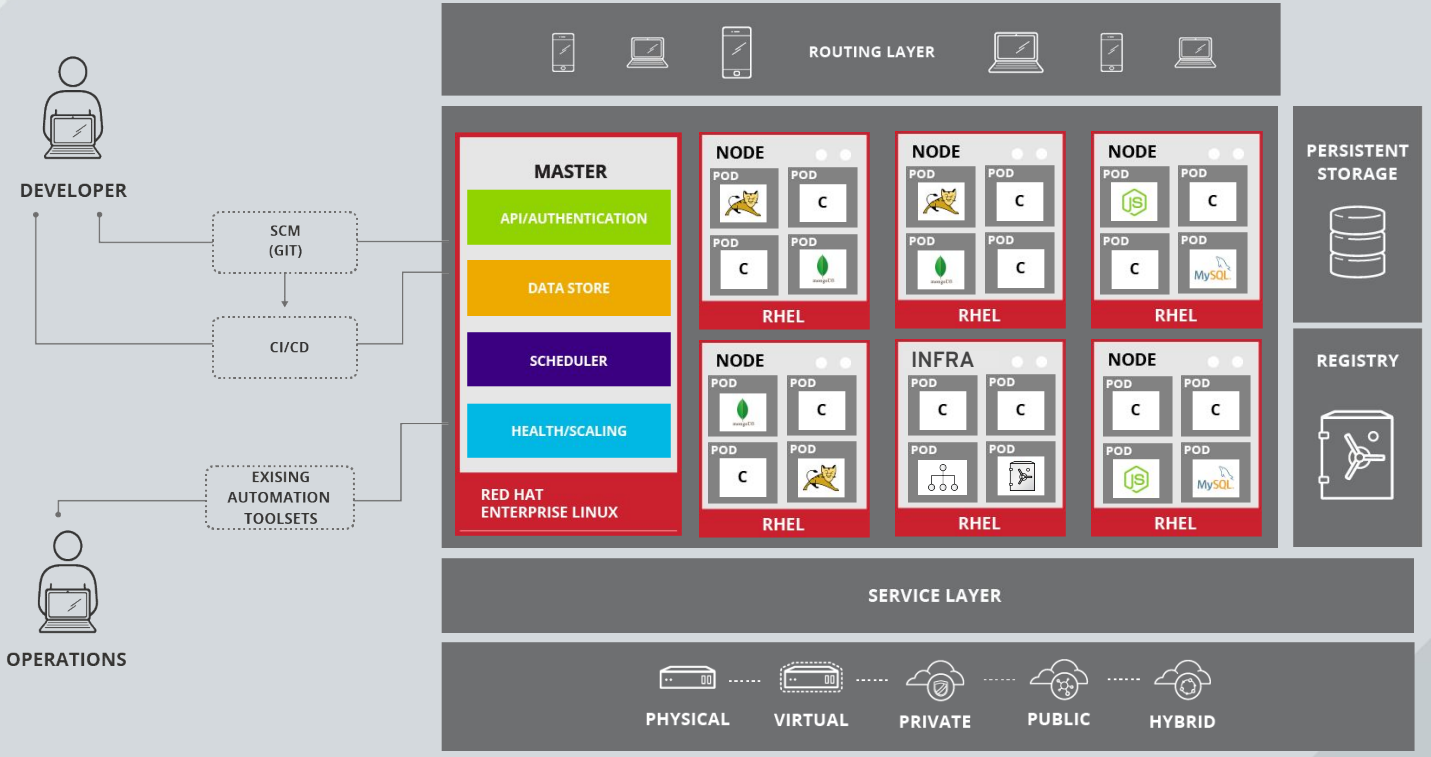
  The detailed geo-replication status command no longer requires master volume, slave host, and slave volume.
  It can be executed with or without these additional details.

  # gluster volume geo-replication status detail

- ## ENHANCED REBALANCE STATUS

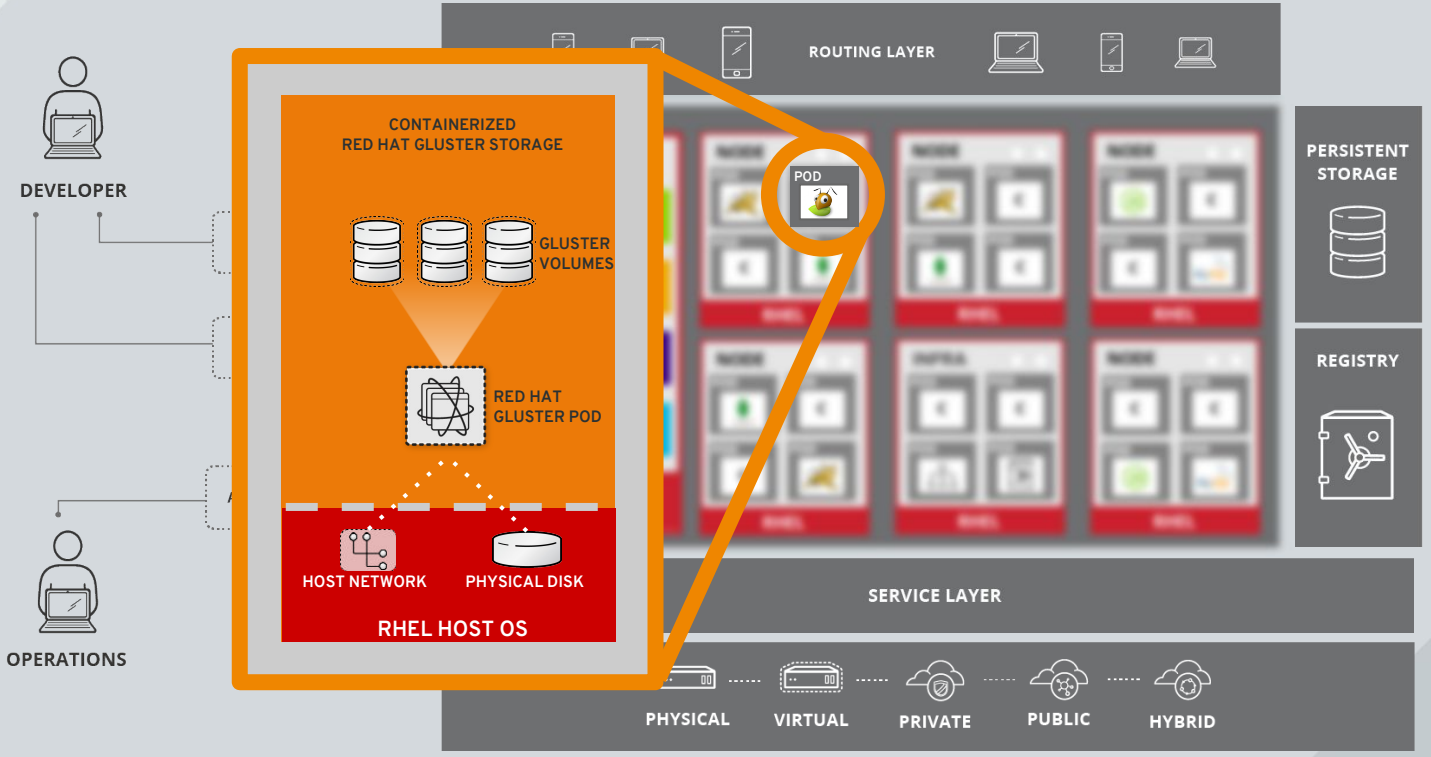
  The command *gluster volume volname rebalance status* now provides an estimate of the time left to rebalance completion. Calculations are based on each brick having its own file system partition.

CONTAINER-NATIVE STORAGE ON OPENSHIFT

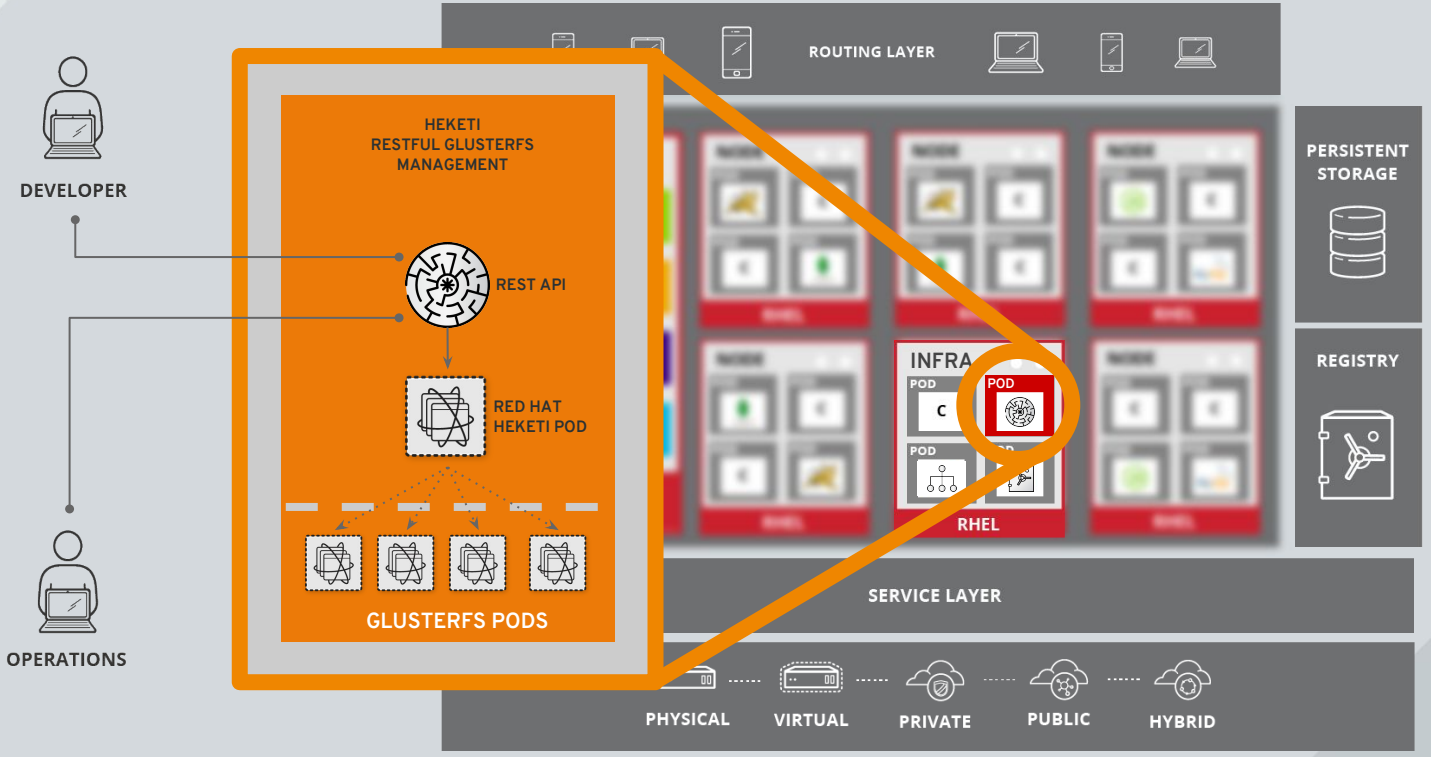


redhat.

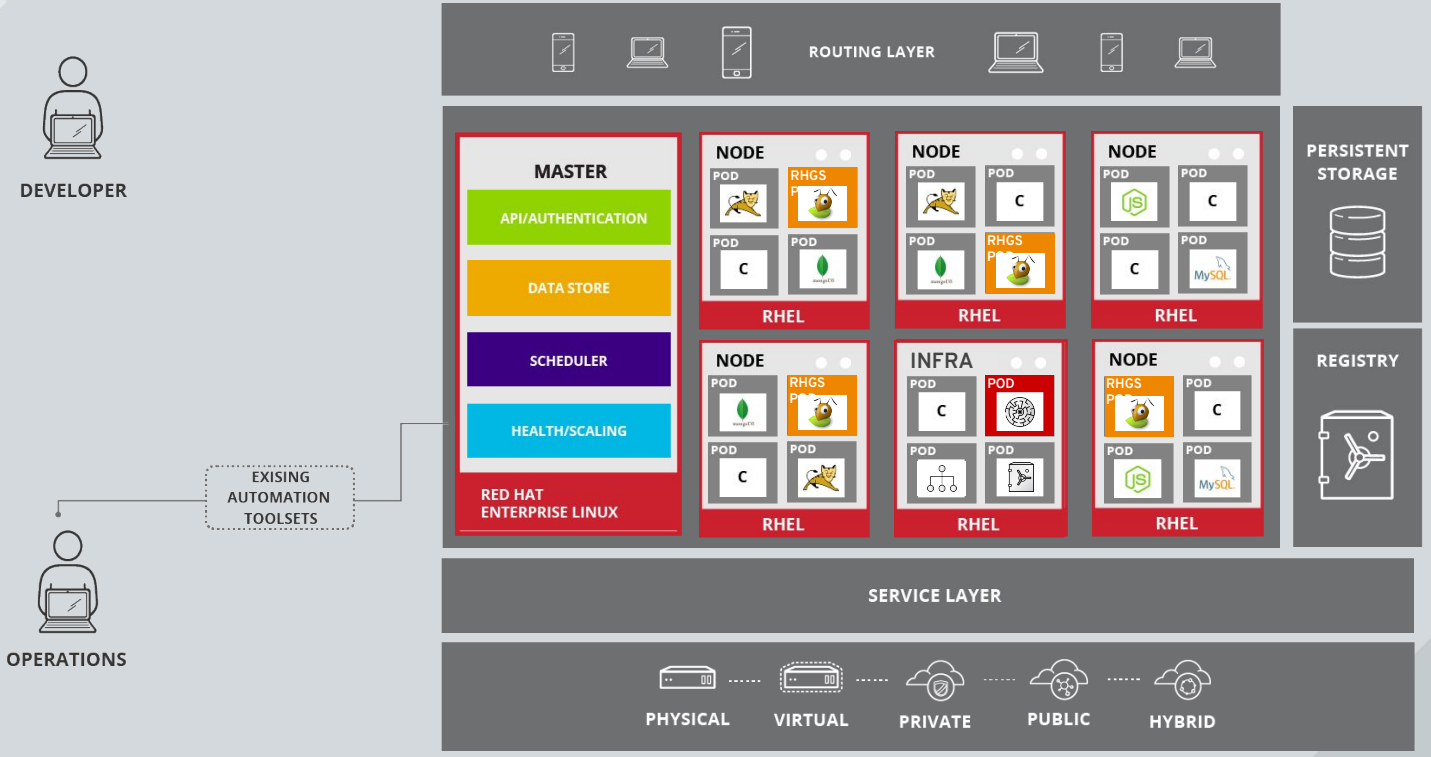
CONTAINER-NATIVE STORAGE ON OPENSHIFT



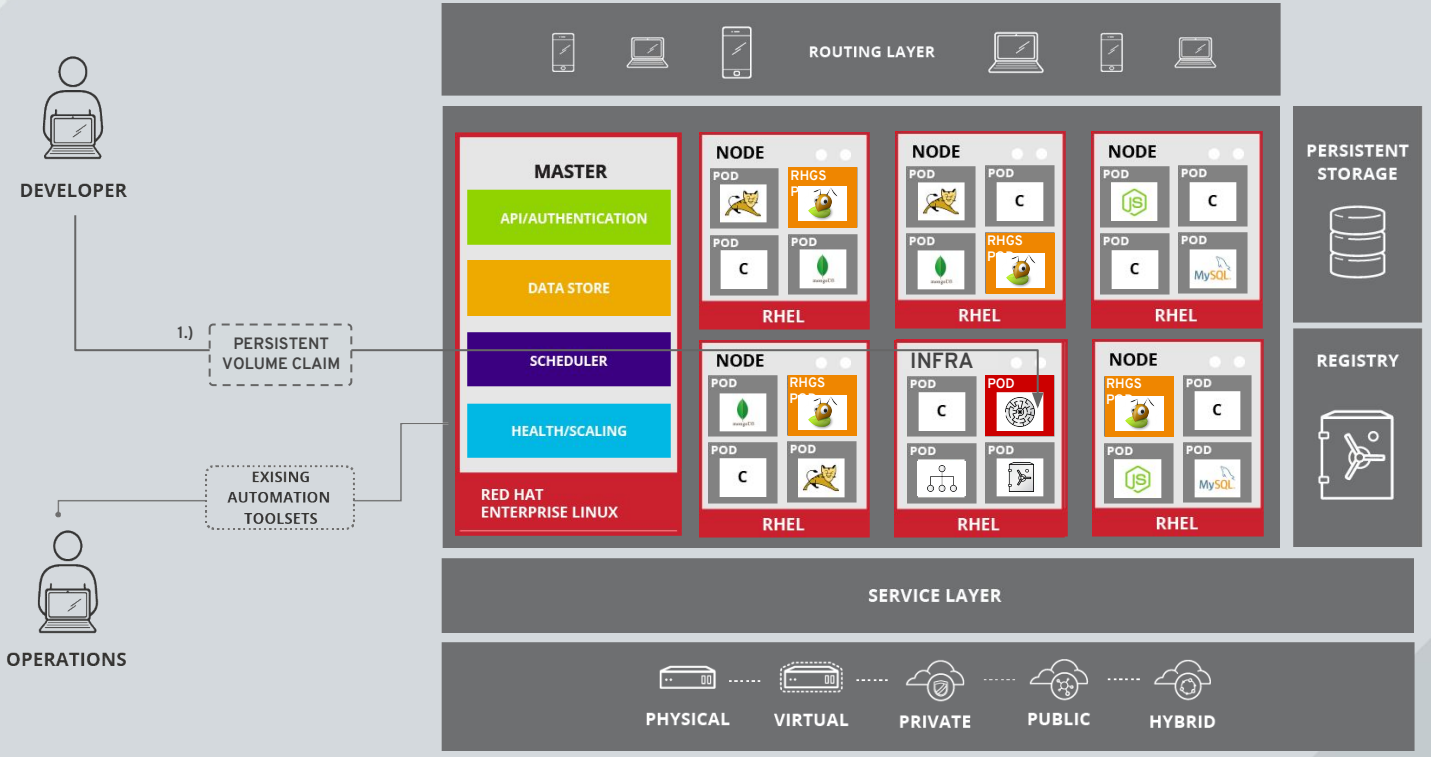
CONTAINER-NATIVE STORAGE ON OPENSHIFT



CONTAINER-NATIVE STORAGE ON OPENSHIFT

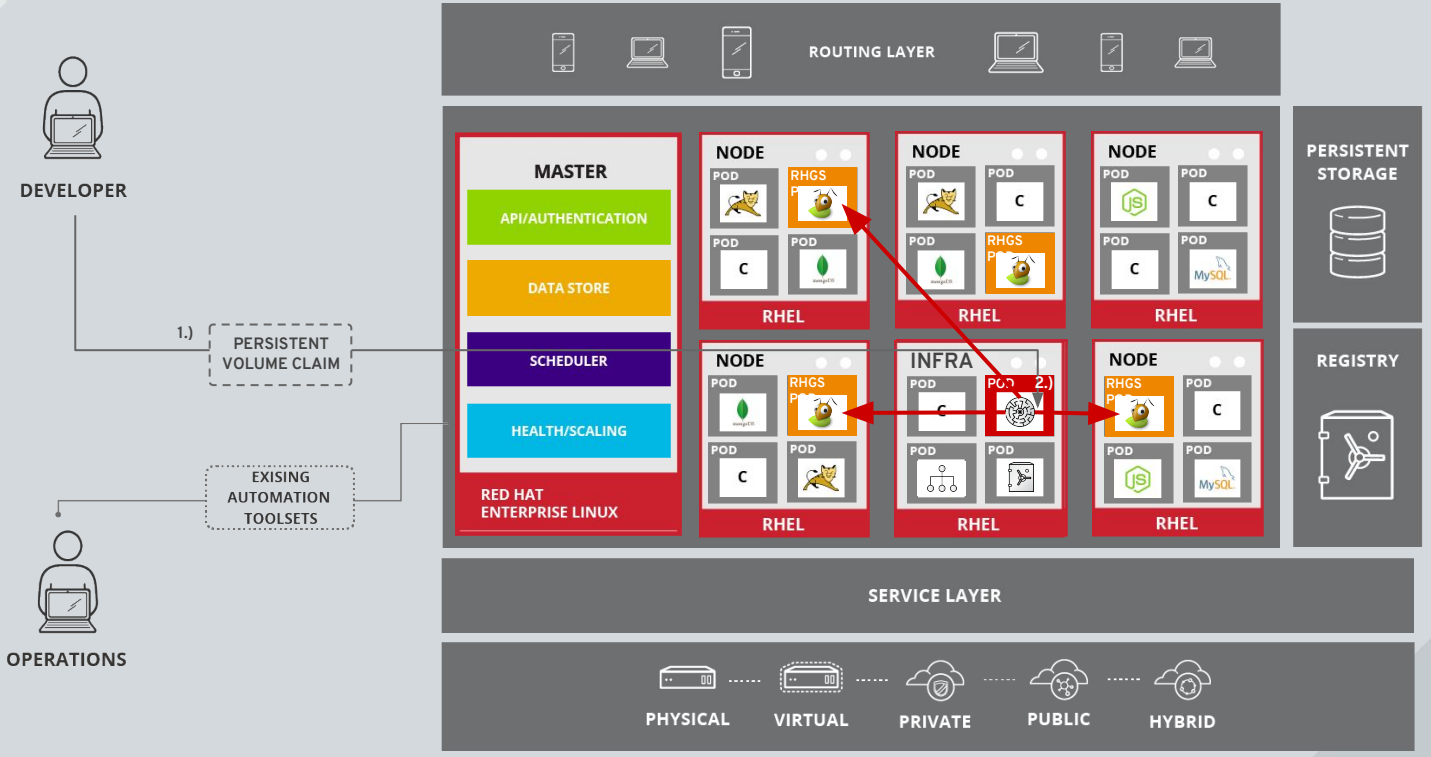


CONTAINER-NATIVE STORAGE ON OPENSHIFT



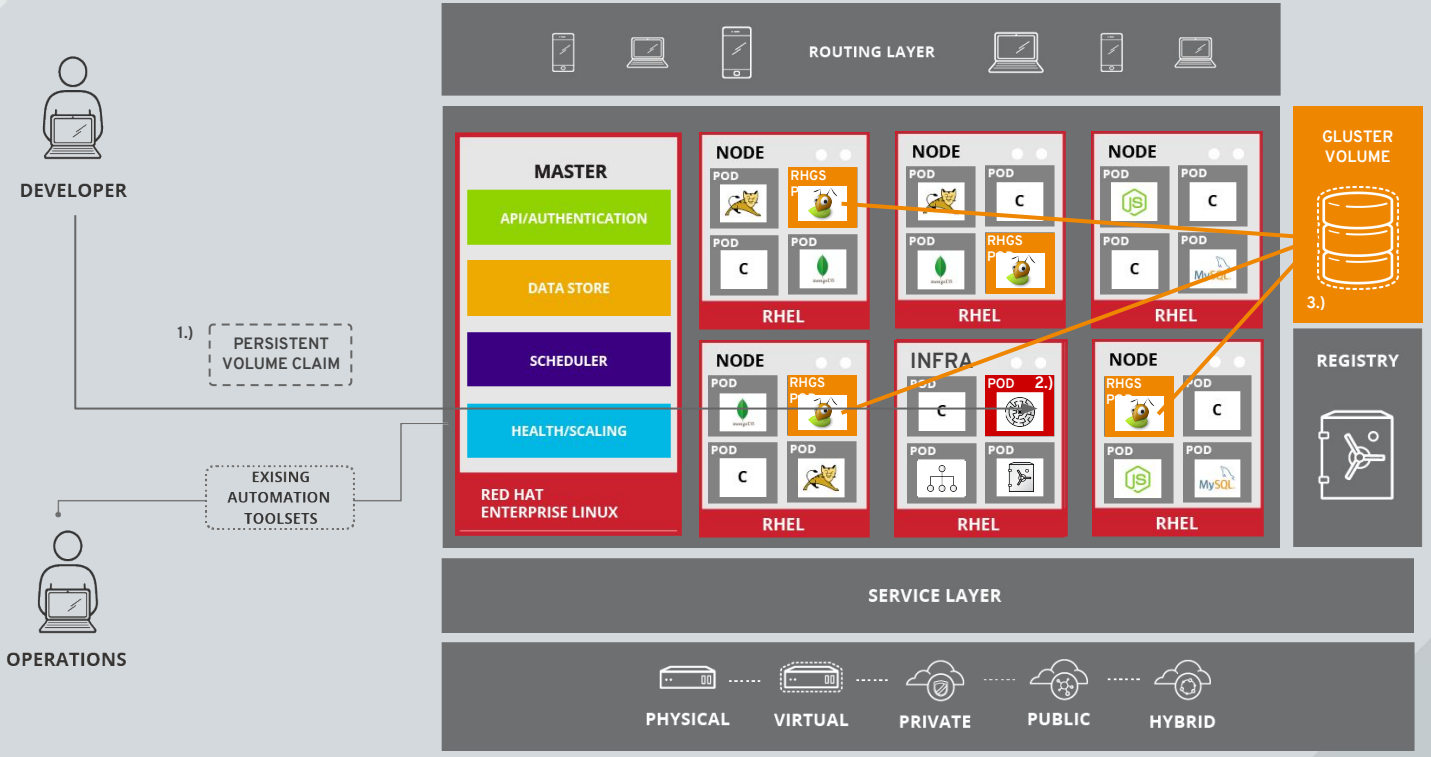
redhat.

CONTAINER-NATIVE STORAGE ON OPENSHIFT



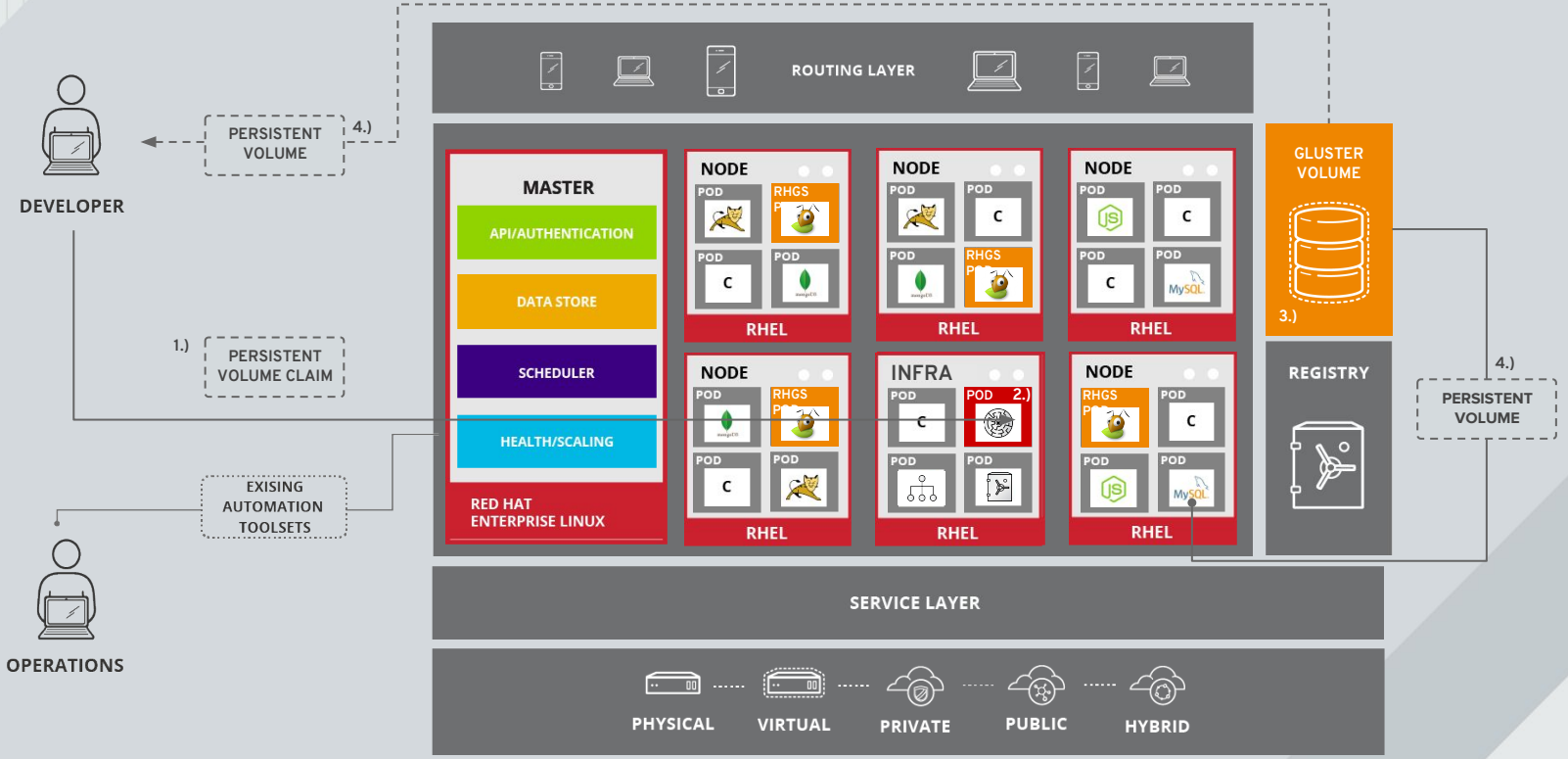
redhat.

CONTAINER-NATIVE STORAGE ON OPENSHIFT



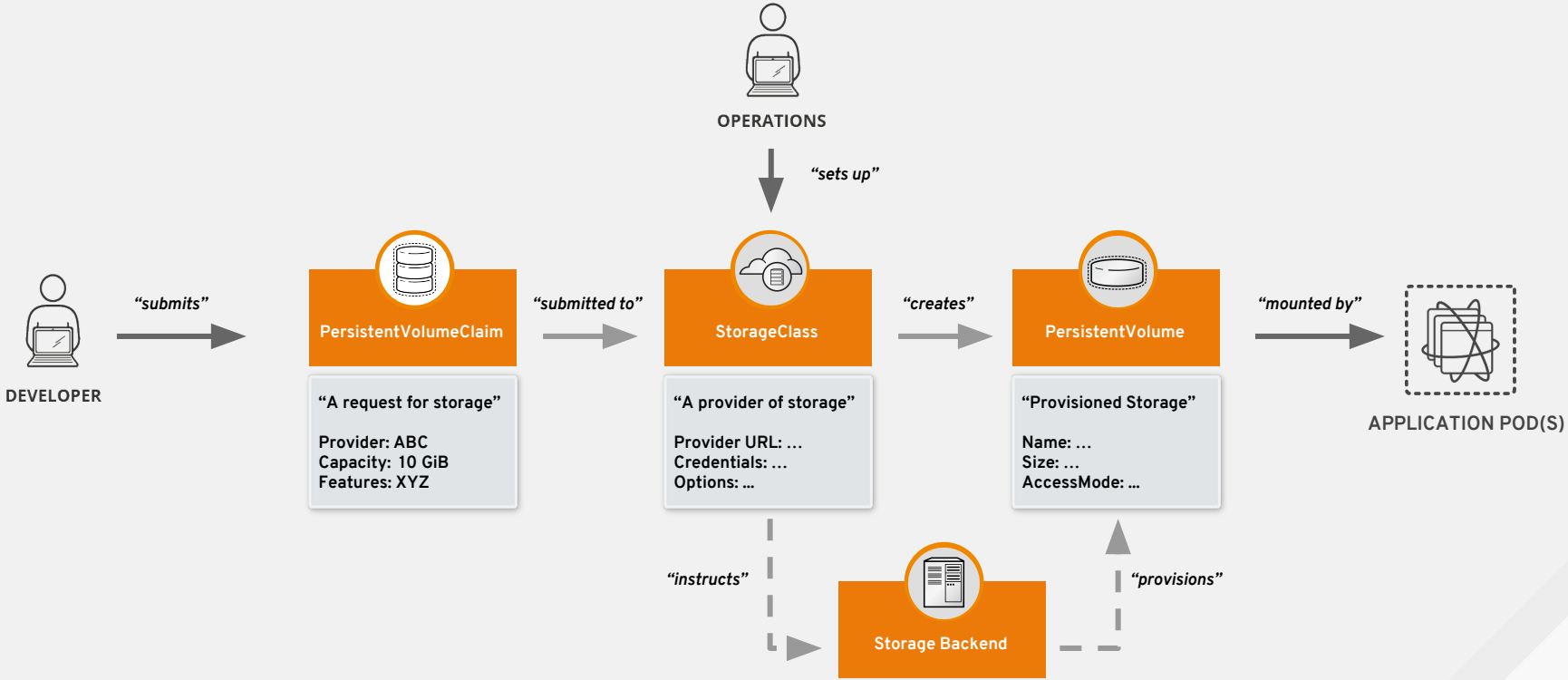
redhat.

CONTAINER-NATIVE STORAGE ON OPENSHIFT



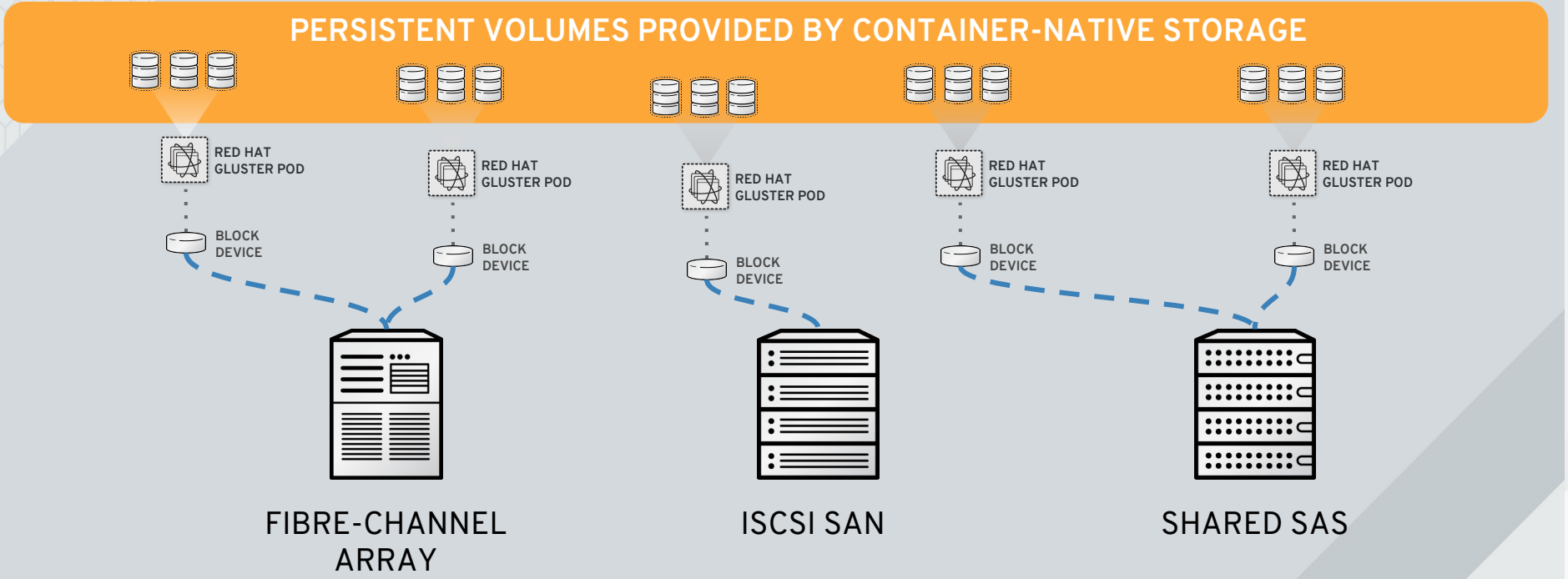
redhat.

OpenShift PersistentStorage System



redhat.

TRANSFORM LEGACY STORAGE TO CONTAINER READY

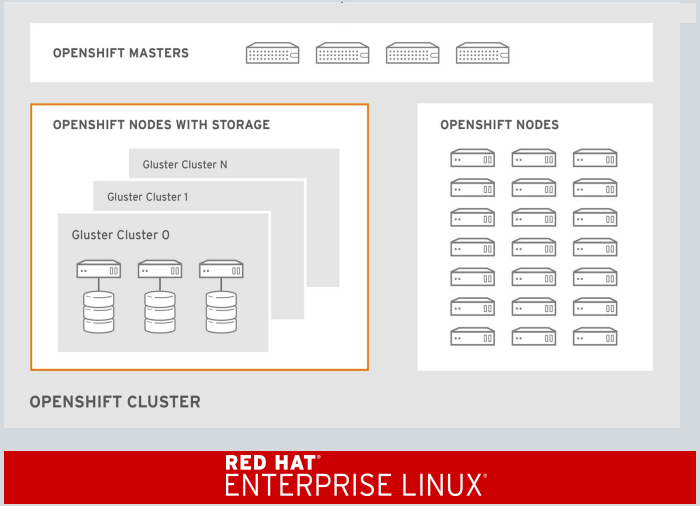


redhat.

SUMMARY

With Container-native Storage

- **Scalable**
  (1000+ volumes)
- **Highly-Available**
  (across availability zones)



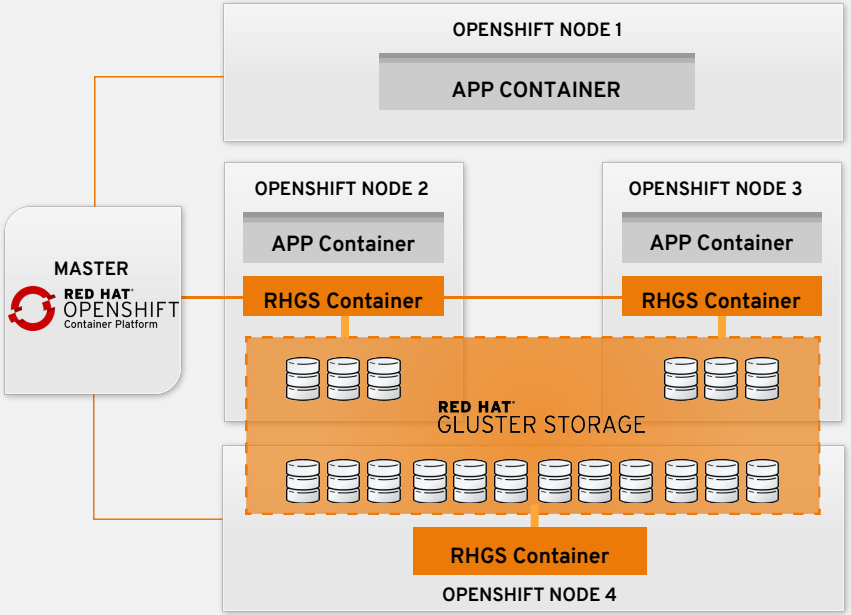
- **Automated**
  (Dynamic Provisioning)
- **Integrated**
  (installs with / runs on OpenShift)

Persistent, resilient and elastic storage...

... that travels with the platform.

Automated Container Native Storage deployment with OCP Advanced Installation

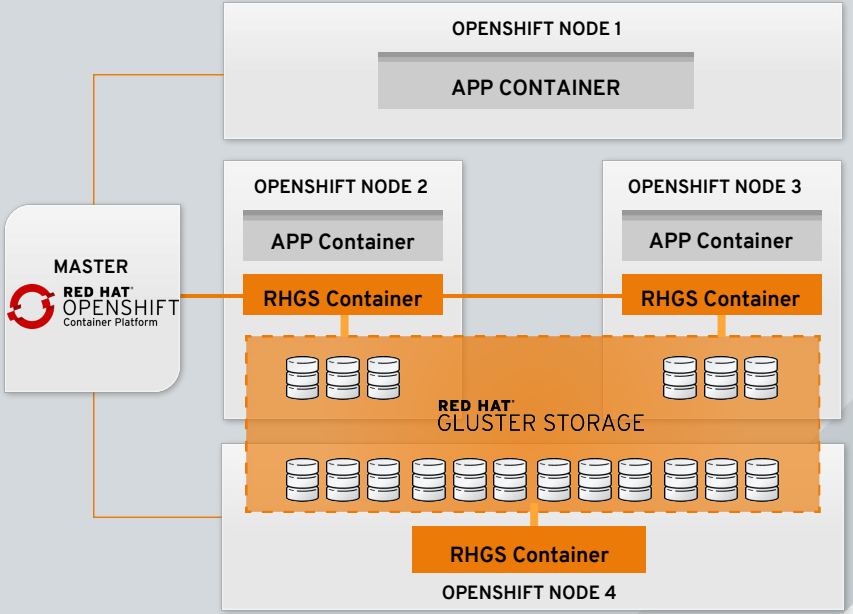
- OCP + CNS deployed as one cluster
- CNS with Block & File provisioners deployed
- OCP Registry deployed on CNS
- Ready to deploy Logging, Metrics on CNS
- CNS uninstaller



Custom Volume Naming

Previously PV Names (*vol_<UUID>* , *vol_1213456)*

- *Specify* new attribute in CNS storage class called **'volumenameprefix'**
- CNS backend volumes will be named ***myPrefix_NameSpace_PVCClaimName_UUID***
- *Easy to recognize, users follow naming convention,*
- *Easy to Search & Apply Policy based on prefix, Namespace, Project Name, or Claim Name*



End-to-End CNS pv expansion

Can be done online from OCP

- Previously only available from Heketi CLI
- User edits PVC for the new size, triggering PV resize
- Fully Qualified for glusterFs backed PV's
- *Gluster-block PV resize will be added with RHEL 7.5*

How it Works/Example:

- Add to storage class AllowVolumeExpansion=true
- oc edit pvc claim-name
- Edit the field 'spec→ requests → storage: new value'

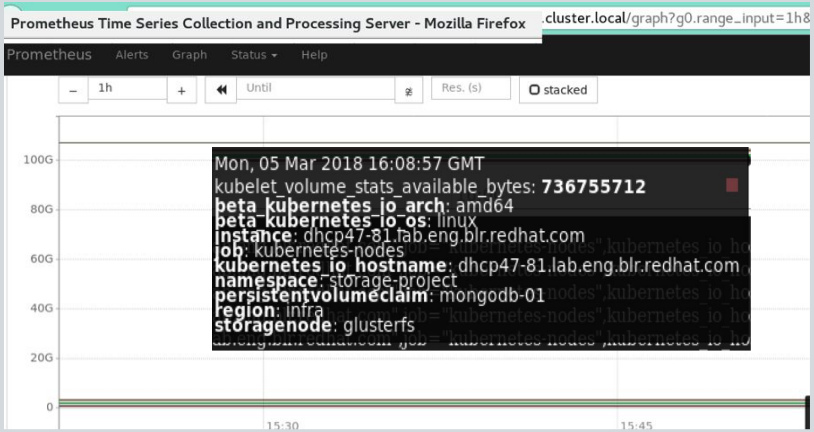
```
# Please edit the object below. Lines be
# and an empty file will abort the edit.
# reopened with the relevant failures.
#
apiVersion: v1
kind: PersistentVolumeClaim
metadata:
  annotations:
    pv.kubernetes.io/bind-completed: "ye
    pv.kubernetes.io/bound-by-controller
    volume.beta.kubernetes.io/storage-cl
    volume.beta.kubernetes.io/storage-pr
  creationTimestamp: 2018-02-07T12:03:36
  finalizers:
  - kubernetes.io/pvc-protection
  name: claim1
  namespace: default
  resourceVersion: "396"
  selfLink: /api/v1/namespaces/default/p
  uid: ed8d425a-0bfe-11e8-b140-c85b7636c
spec:
  accessModes:
  - ReadOnlyMany
  resources:
    requests:
      storage: 12Gi
  volumeMode: Filesystem
  volumeName: pvc-ed8d425a-0bfe-11e8-b14
status:
```

Capacity usage metrics

CNS GlusterFS extended to provide PV volume metrics (including consumption) through Prometheus or Query

- Metrics available from PVC end point
- User can now know PV size allocated as well as consumed and use resize (Expand) of PV if needed from OCP
- Example Metrics added
- *kubelet_volume_stats_capacity_bytes*
- *kubelet_volume_stats_inodes*
- *kubelet_volume_stats_inodes_free*
- *kubelet_volume_stats_inodes_used*
- *kubelet_volume_stats_used_bytes ….etc*

Prometheus



‘curl’

```
# TYPE kubelet_volume_stats_available_bytes gauge
kubelet_volume_stats_available_bytes{namespace="default",persistentvolumeclaim="claim1"} 8.543010816e+09
# TYPE kubelet_volume_stats_capacity_bytes gauge
kubelet_volume_stats_capacity_bytes{namespace="default",persistentvolumeclaim="claim1"} 8.57735168e+09
```

Heketidb - maintenance

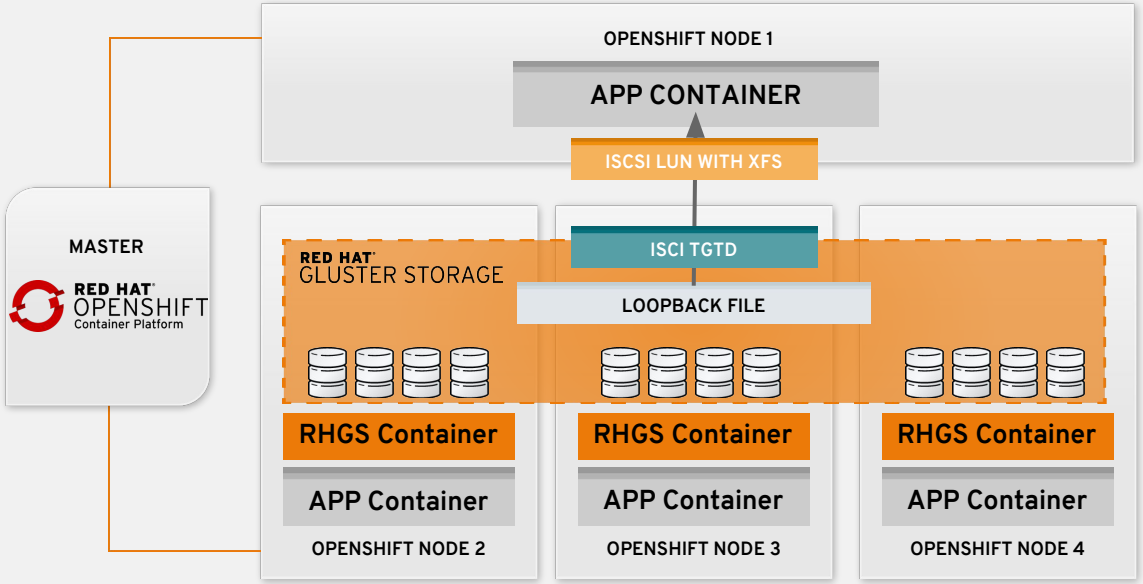
$ heketi-cli db dump

$ heket-cli db import
(can even be done without heketi daemon running)

$ heketi-cli db repair

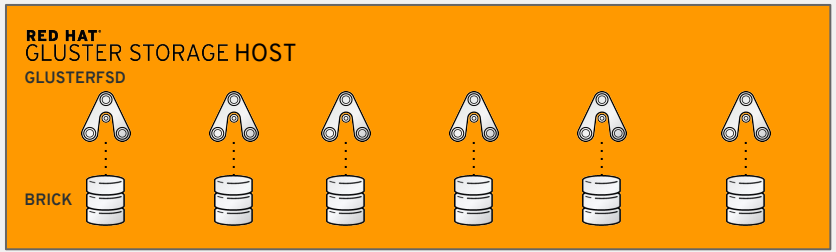
CONTAINER-NATIVE STORAGE BLOCK STORAGE

ENABLES LOGGING/METRICS ON CNS



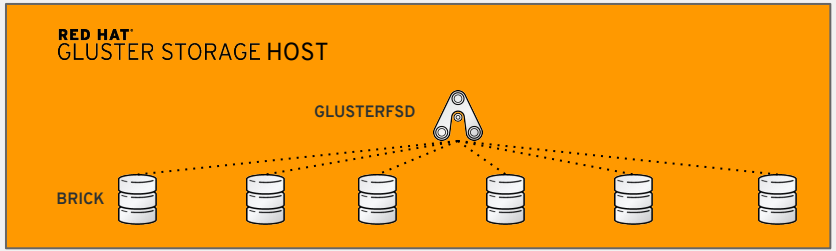
BRICK-MULTIPLEXING

BEFORE



300 MB RAM /Brick

AFTER



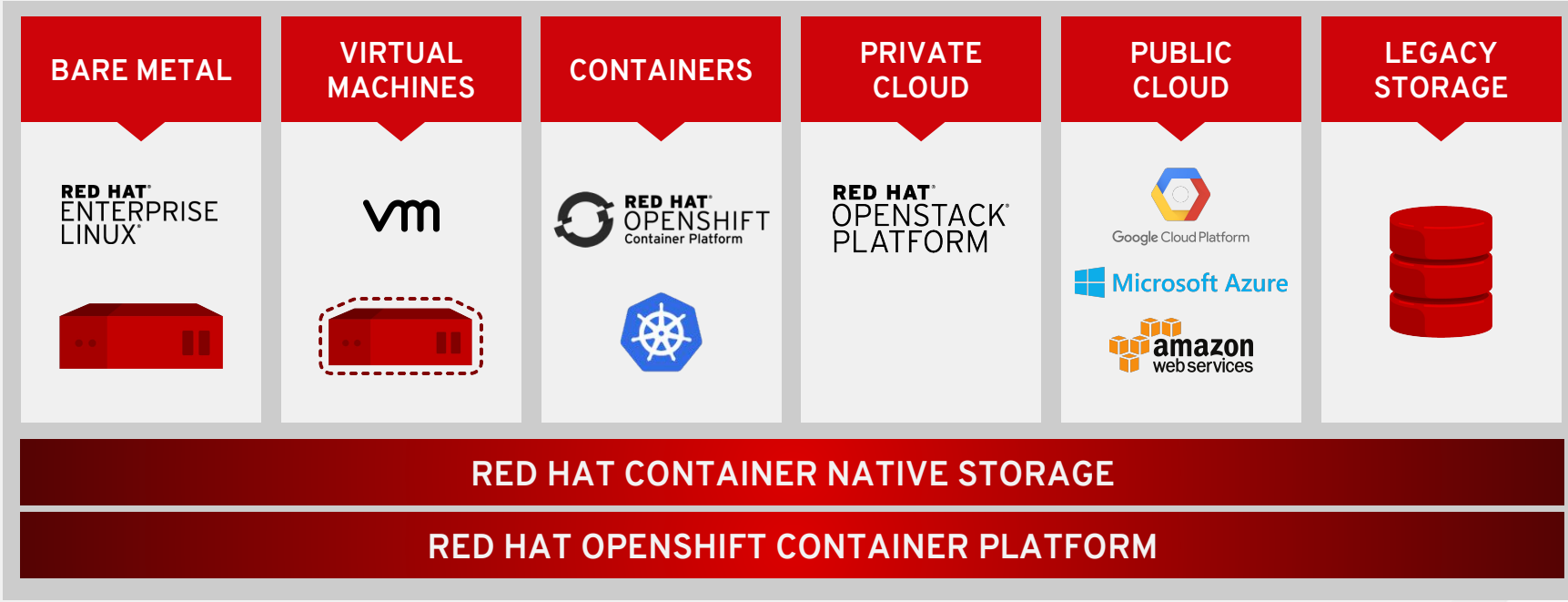
30 MB RAM /Brick

Recommended 8GB RAM baseline + 30MB per brick

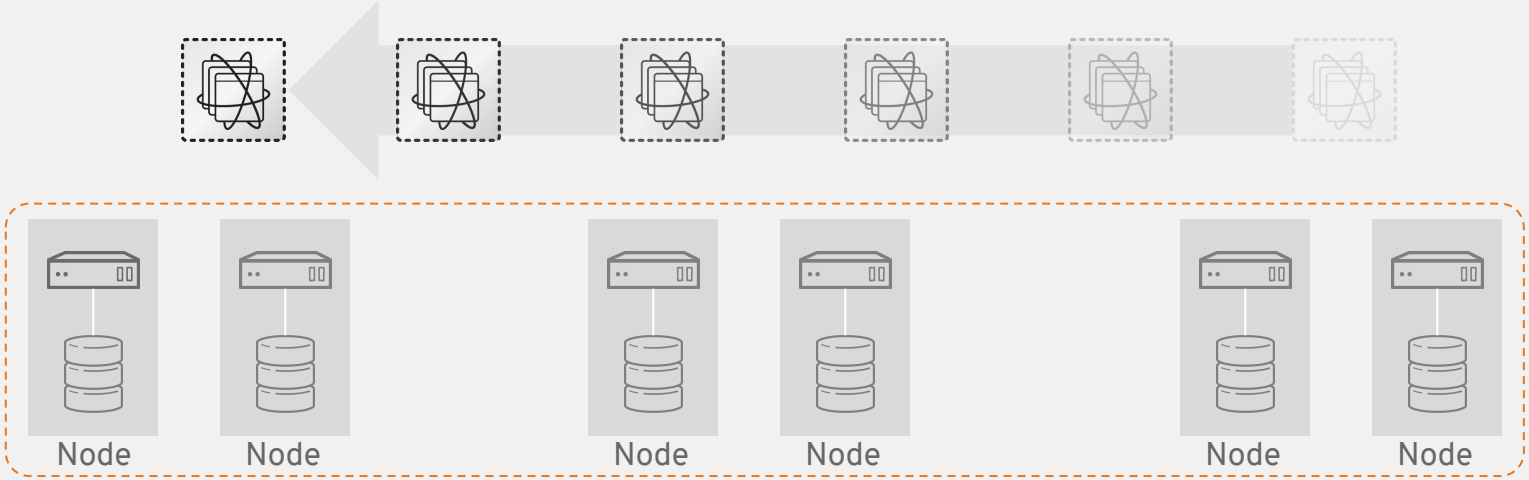
redhat.

Consistent Storage Experience Across The Hybrid Cloud

Application Portability And Lower Costs



Simplify Container Availability



redhat.

Red Hat Ceph Storage

- **RED HAT®**
  CEPH STORAGE

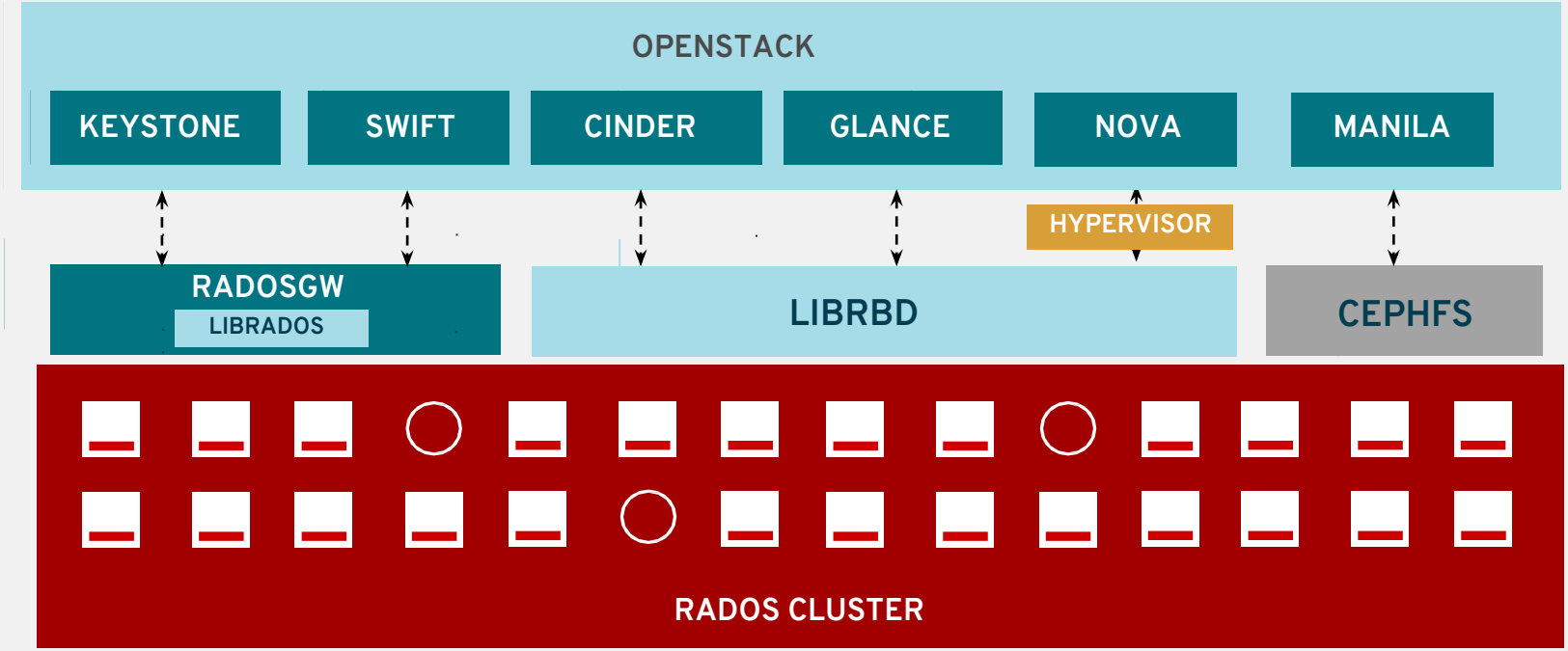
OpenStack Storage (Cinder/Glance/Swift/Nova/Manila)

S3 scale-out Object Storage (AWS Compatible S3)

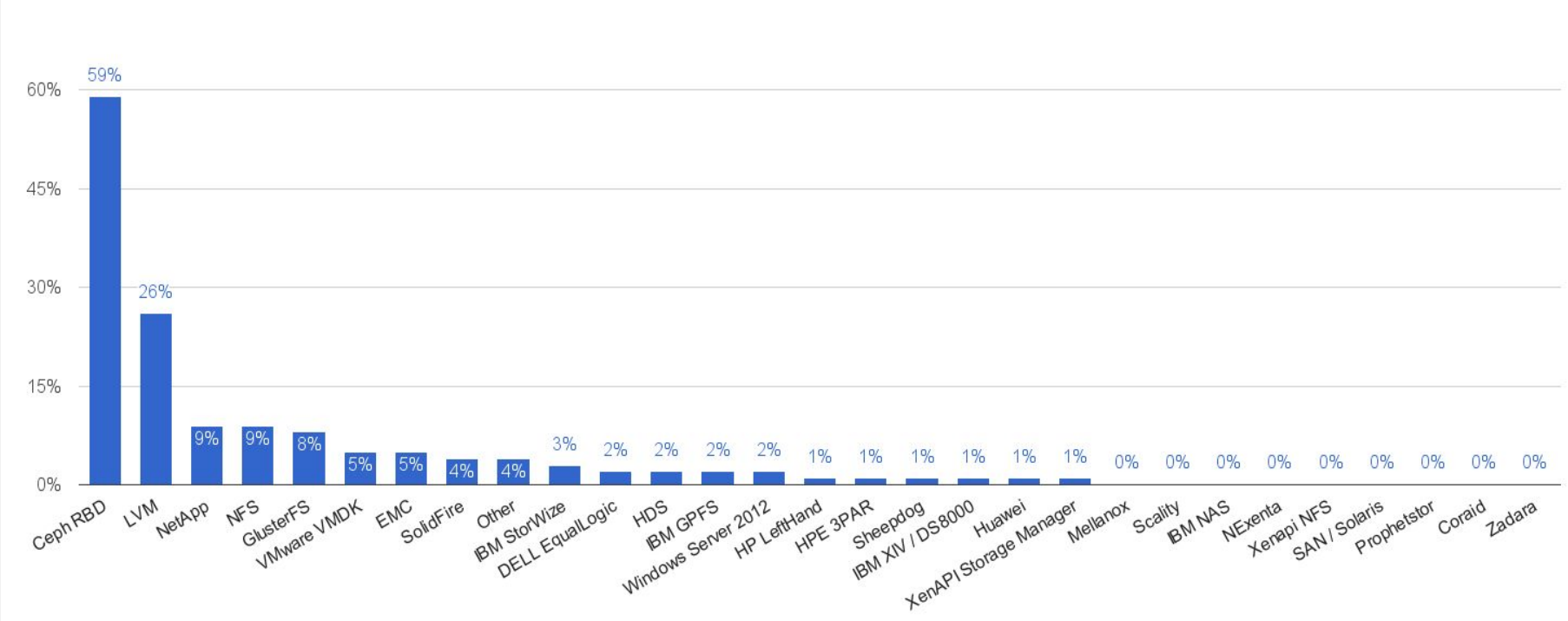
Elastic Data Lake Storage (S3A)

Easy tools to ingest data, NFS gateway for RADOS-GW

RED HAT CEPH STORAGE AND OPENSTACK



Which OpenStack Cinder driver are you using?



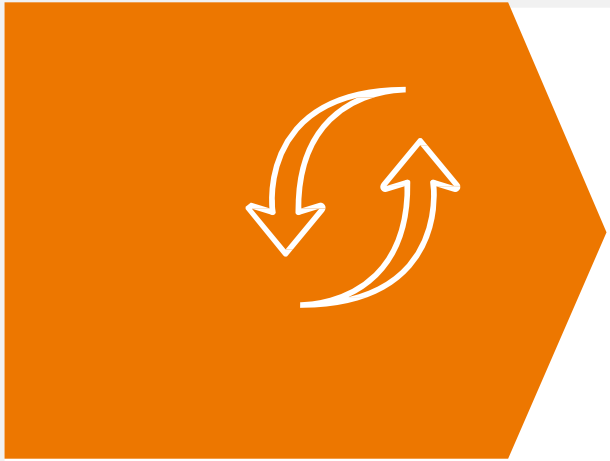
Source: http://www.openstack.org/analytics

redhat.

Red Hat Ceph Storage
What's new...

redhat

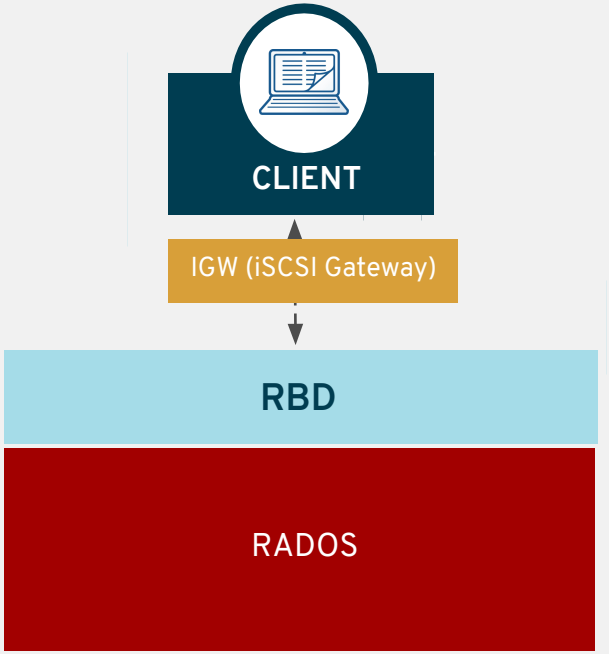
NFS RGW Gateway



- Provides NFS file access on top of RGW object API
- NFS V4 support
- Hosts can mount and access the object namespace using NFS mount
- Files are internally stored as objects inside buckets
- Gateway seamlessly translates between host file semantics and RHCS object semantics.
- No caching of files or data required

redhat.

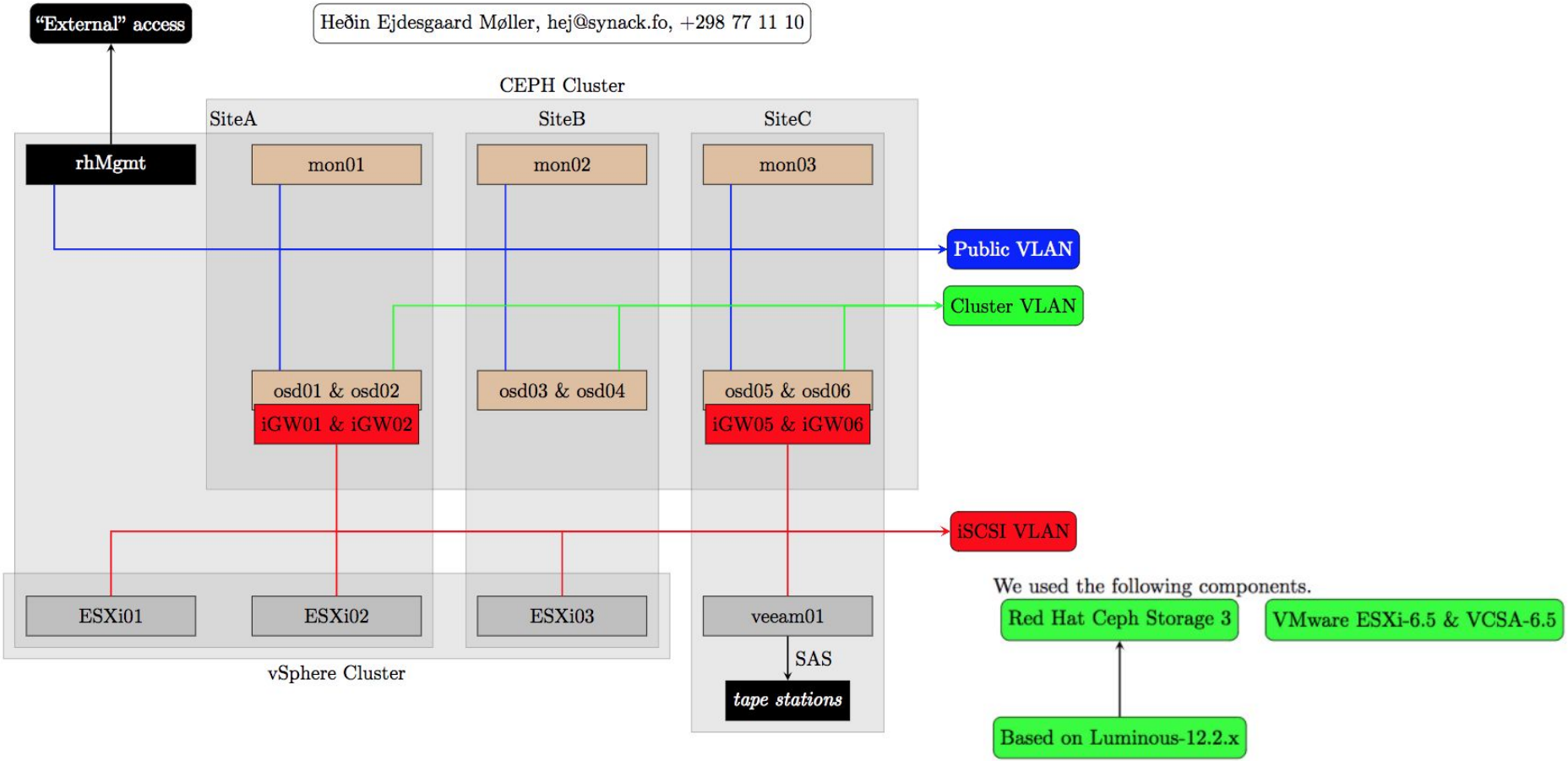
ISCSI BLOCK STORAGE



Sending a lifeline to legacy

- Block-level access via industry storage networking standard to storage devices and data on VMware, RHV, native Windows & RHEL
- Backwards compatibility facilitating transition between architectures
- Ceph for backup and recovery ancillary use cases
- ROI benefits from consolidated, unified storage platform
- Complement to NFS for migrating legacy workloads

redhat.


"External" access
Heðin Ejdesgaard Møller, hej@synack.fo, +298 77 11 10
CEPH Cluster
SiteA
SiteB
SiteC
rhMgmt
mon01
mon02
mon03
Public VLAN
Cluster VLAN
osd01 & osd02
iGW01 & iGW02
osd03 & osd04
osd05 & osd06
iGW05 & iGW06
iSCSI VLAN
ESXi01
ESXi02
ESXi03
veeam01
SAS
tape stations
vSphere Cluster
We used the following components.
Red Hat Ceph Storage 3
VMware ESXi-6.5 & VCSA-6.5
Based on Luminous-12.2.x

Red Hat Ceph Storage - now containerized

Deploy Red Hat Ceph enterprise storage in Linux containers

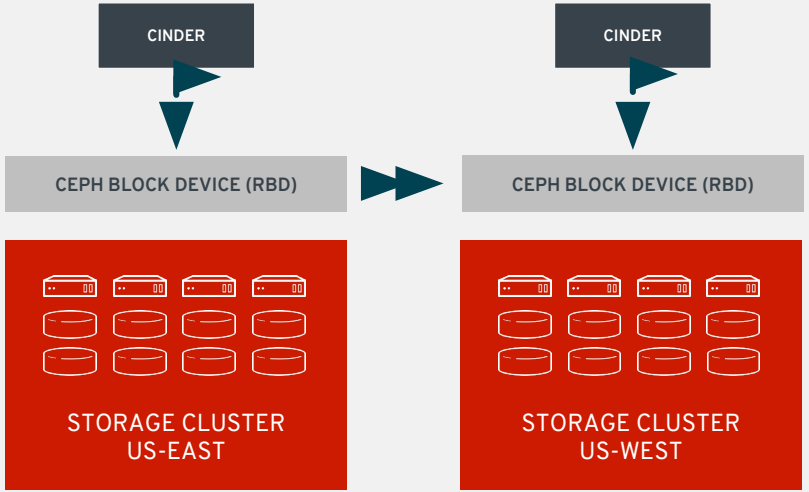
for simplified operations and a smaller hardware footprint. Containerized storage daemons enable users to run Red Hat Ceph Storage on fewer servers by co-locating services that previously required dedicated hardware while avoiding the risk of resource conflicts. Preliminary tests based on a standard Red Hat Ceph Storage cluster configuration showed lowered hardware expenditure by at least 24 percent.

redhat.

RBD MIRRORING

New daemon ‘rbd-mirror’ synchronises Ceph images from one cluster to another

- Relies on two new RBD image features:
  - Journaling: enables journaling for every transaction on the image
  - Mirroring: tells the rbd-mirror daemon to replicate images
- Images have states: primary and non-primary (promote and demote calls)

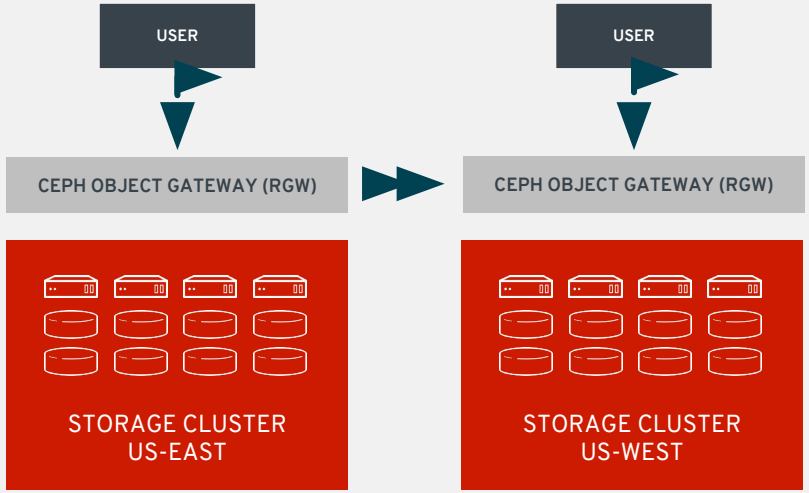


redhat.

Rados Gateway multisite

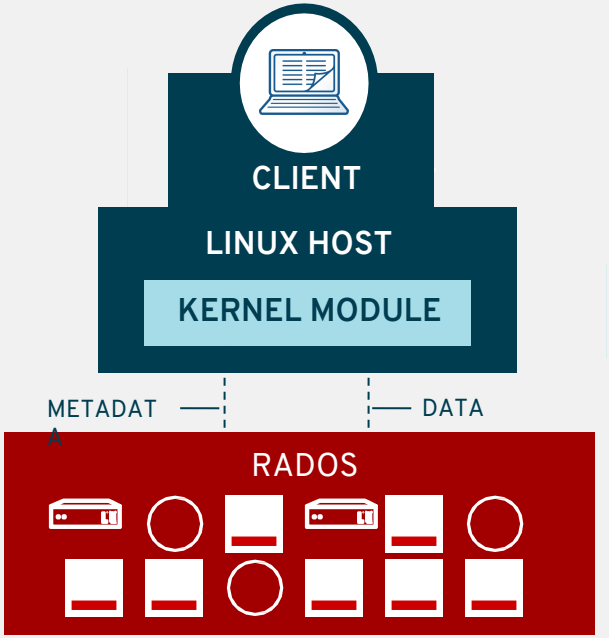
Global object storage clusters with a single namespace

- Enables deployment of clusters across multiple geographic locations
- Clusters synchronize, allowing users to read from or write to the closest one



redhat.

FILE STORAGE with CEPHFS

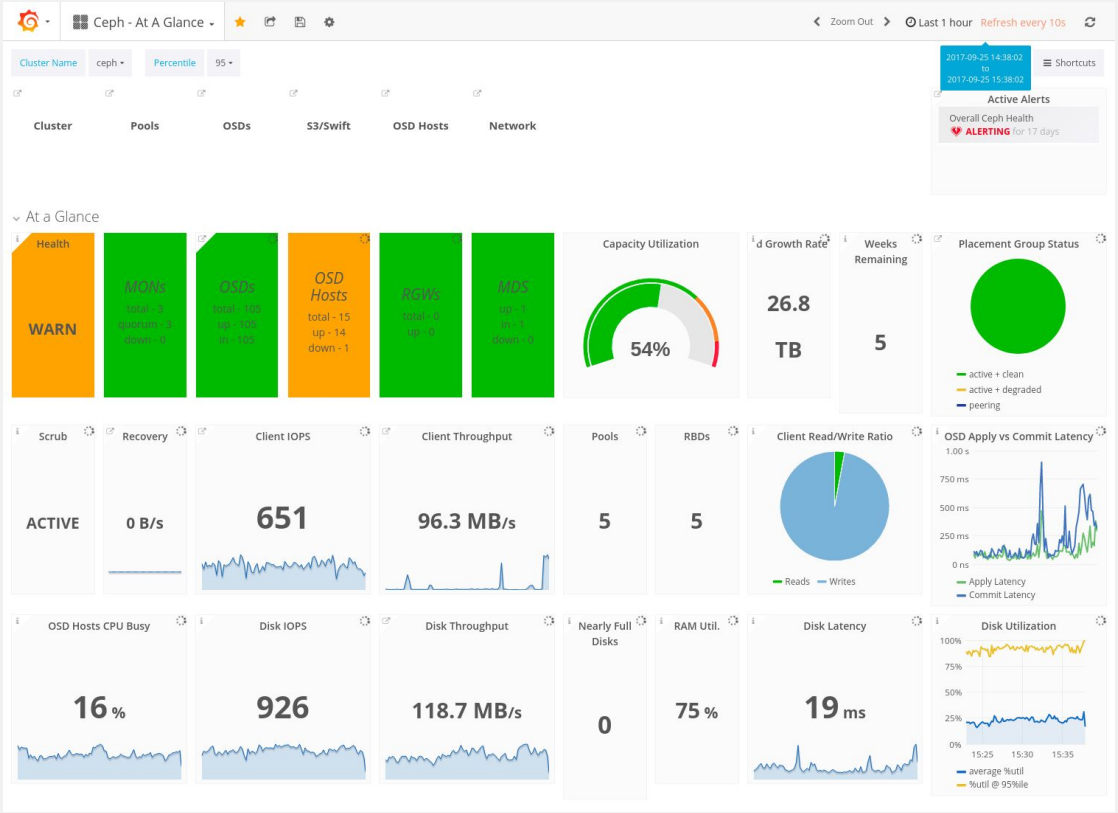


File services at scale

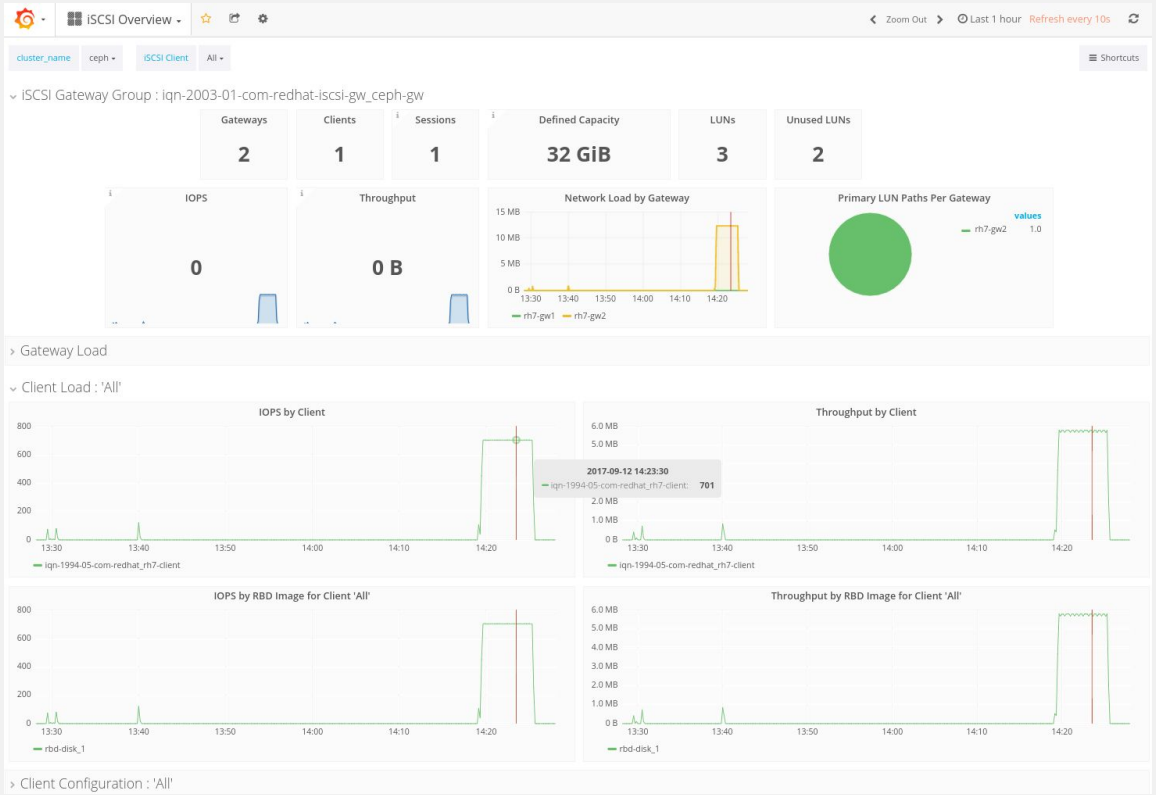
- Sharing infrastructure with RBD, RGW deployments.
- Very high scale data throughput (RADOS). One of only FS in the world where you can put PB's of data.
- Scale-out metadata performance (multiple metadata data servers).
- OpenStack Manila integration, nfs-ganesha integration (tech-preview)

redhat.

THE AT-A-GLANCE DASHBOARD

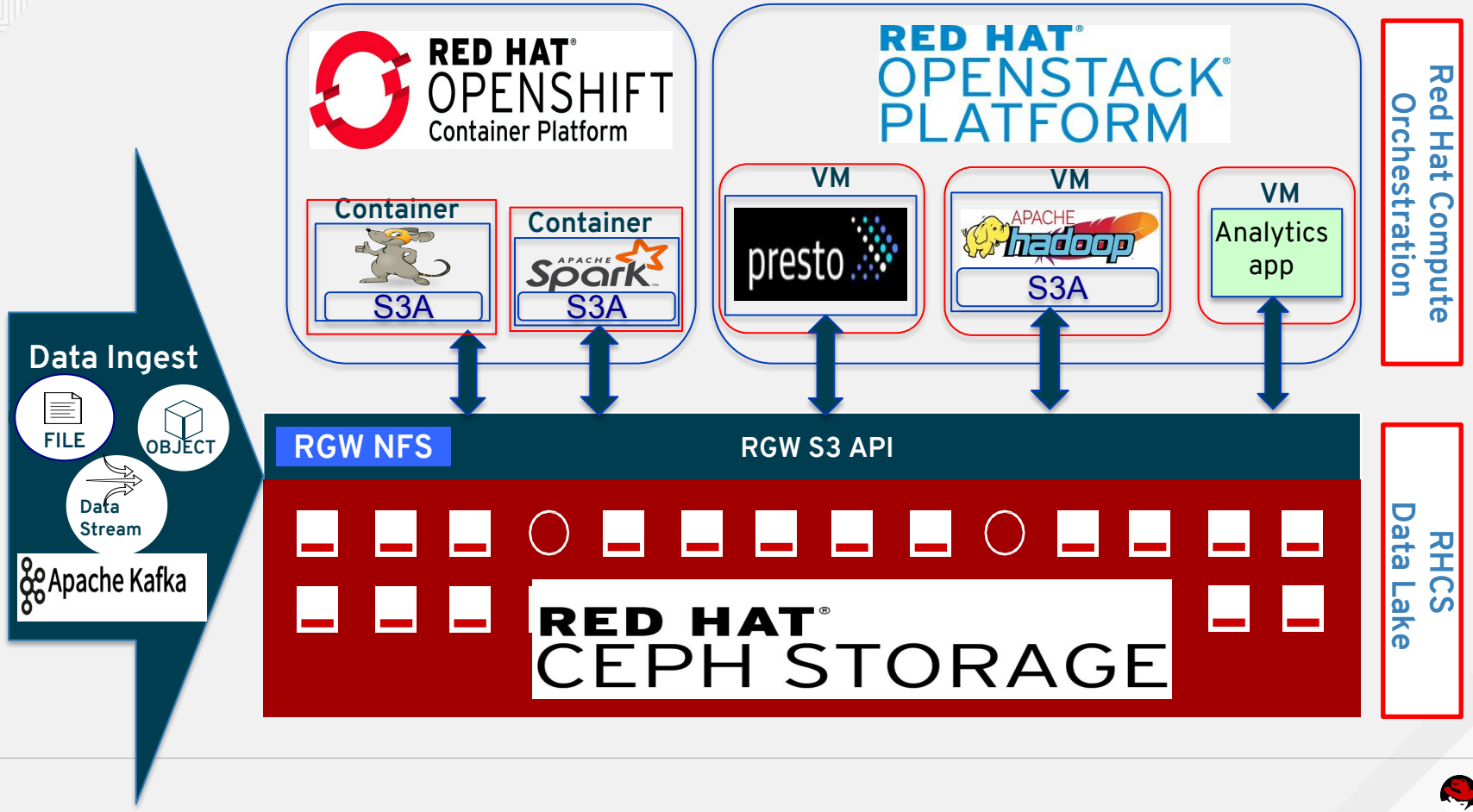


UNDERSTANDING LOAD - “cephmetrics”

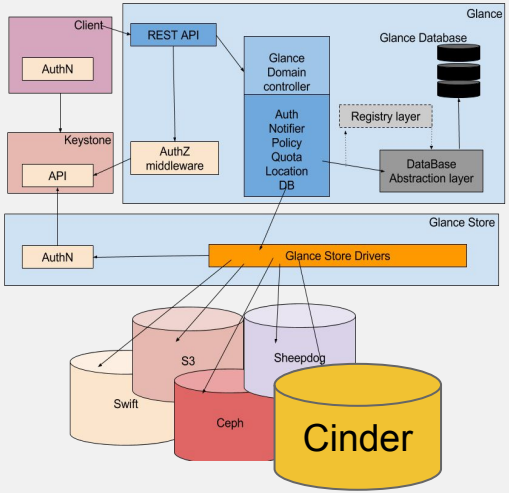


redhat.

RHCS Data lake vision – On-demand compute and centralized object storage



Red Hat Ceph Storage integration with OpenStack



Create a volume from an image with a cinder backend.

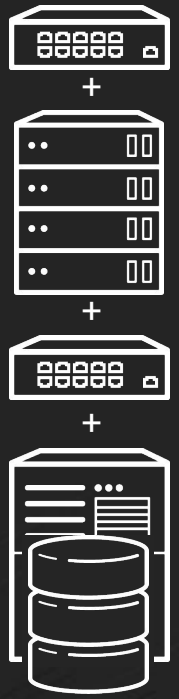
Capacity Derived IOPs

Values can be scaled (ie multiplied) by volume size for setting dynamic limits.

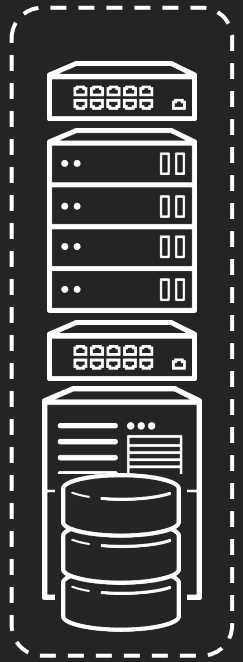
QoS Spec Key	QoS Spec Value	2 GB Volume	5 GB Volume
Read IOPS / GB	10000	20000 IOPS	50000 IOPS
Write IOPS / GB	5000	10000 IOPS	25000 IOPS

redhat.

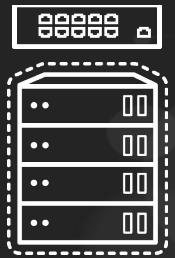
Red Hat Hyperconverged Infrastructure
RHHI



Traditional Architecture



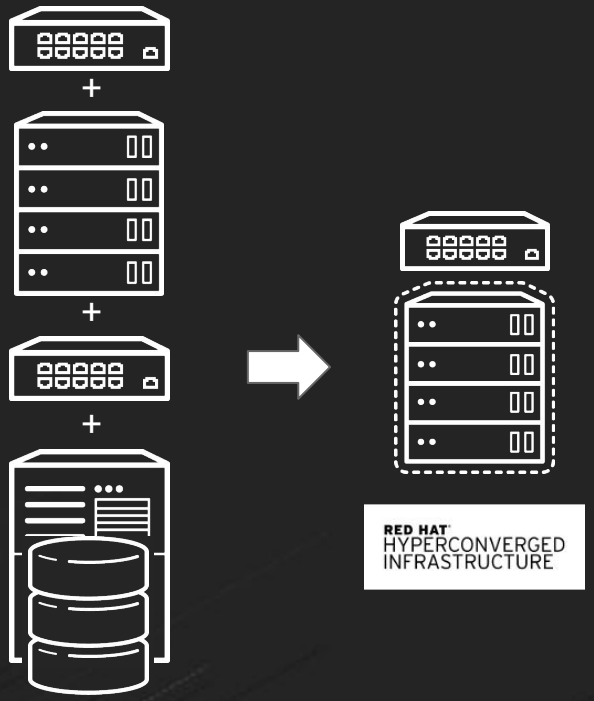
Converged Infrastructure



Hyper converged Infrastructure

redhat.

INFRASTRUCTURE CONSOLIDATION & OPERATIONAL EFFICIENCY



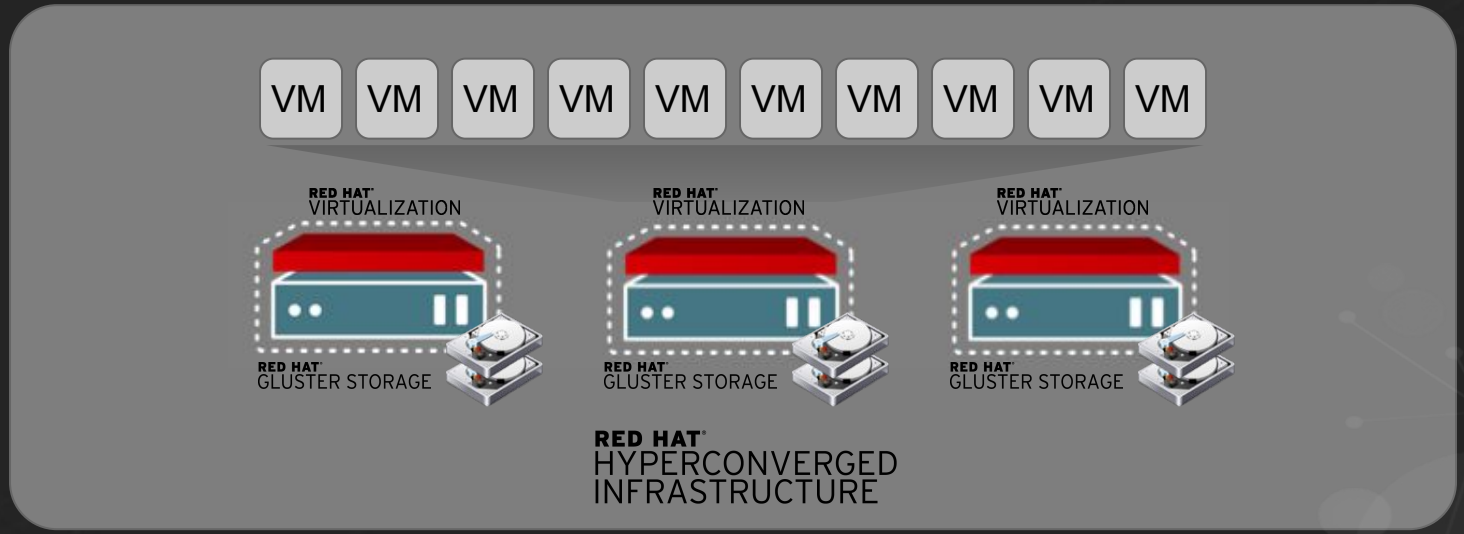
- Single budget for compute & storage
- One team to managing infrastructure
- Simplified planning & procurement
- Streamlined deployment & management
- Single support stack for compute and storage
- Maximizing resource utilization

Traditional Architecture

redhat.

RED HAT HYPERCONVERGED INFRASTRUCTURE

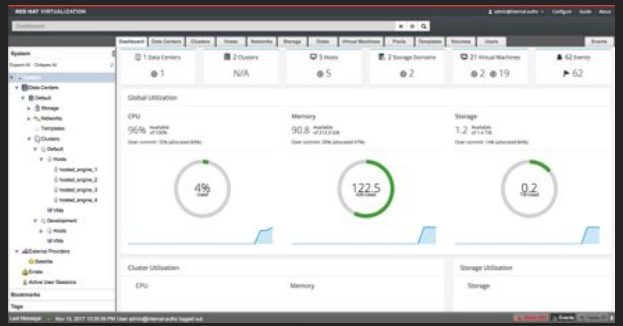
OPTIMIZE, INTEGRATE, MANAGE



redhat.

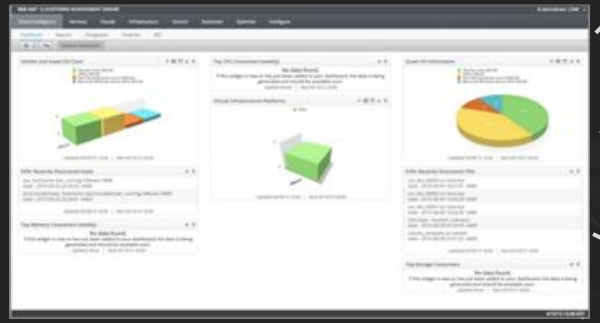
MANAGING YOUR RED HAT HYPERCONVERGED INFRASTRUCTURE INSTALLATION

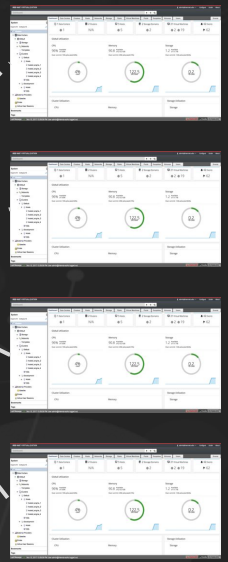
RED HAT VIRTUALIZATION MANAGER



Provides secure web interface (HTTPS) as well as role based access for administration of compute, network, and storage resources.

RED HAT CLOUDFORMS (optional)





Provides orchestration, self-service catalogs, central management for many Red Hat Hyperconverged Infrastructure deployments, chargeback, and policy enforcement.*

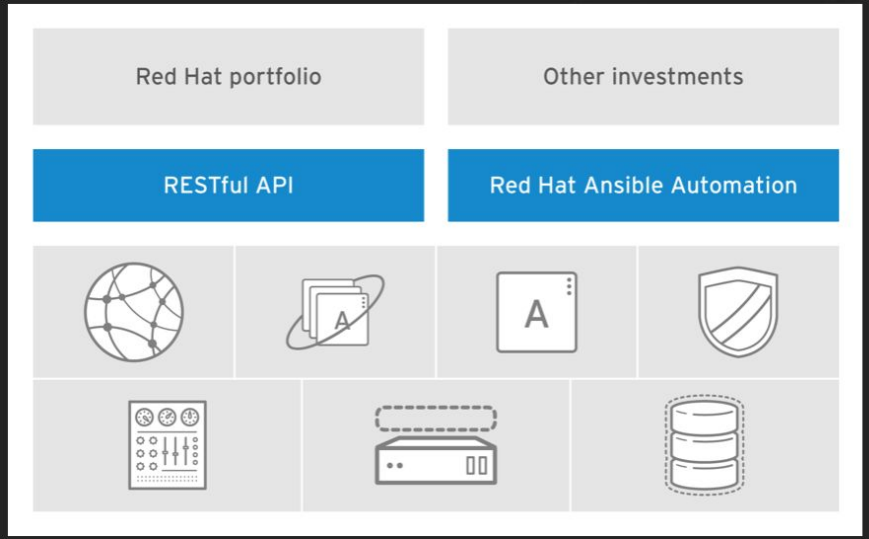
*CloudForms is not part of the Red Hat Hyperconverged Infrastructure product or SKU; it is a separate product.

redhat.

RED HAT VIRTUALIZATION

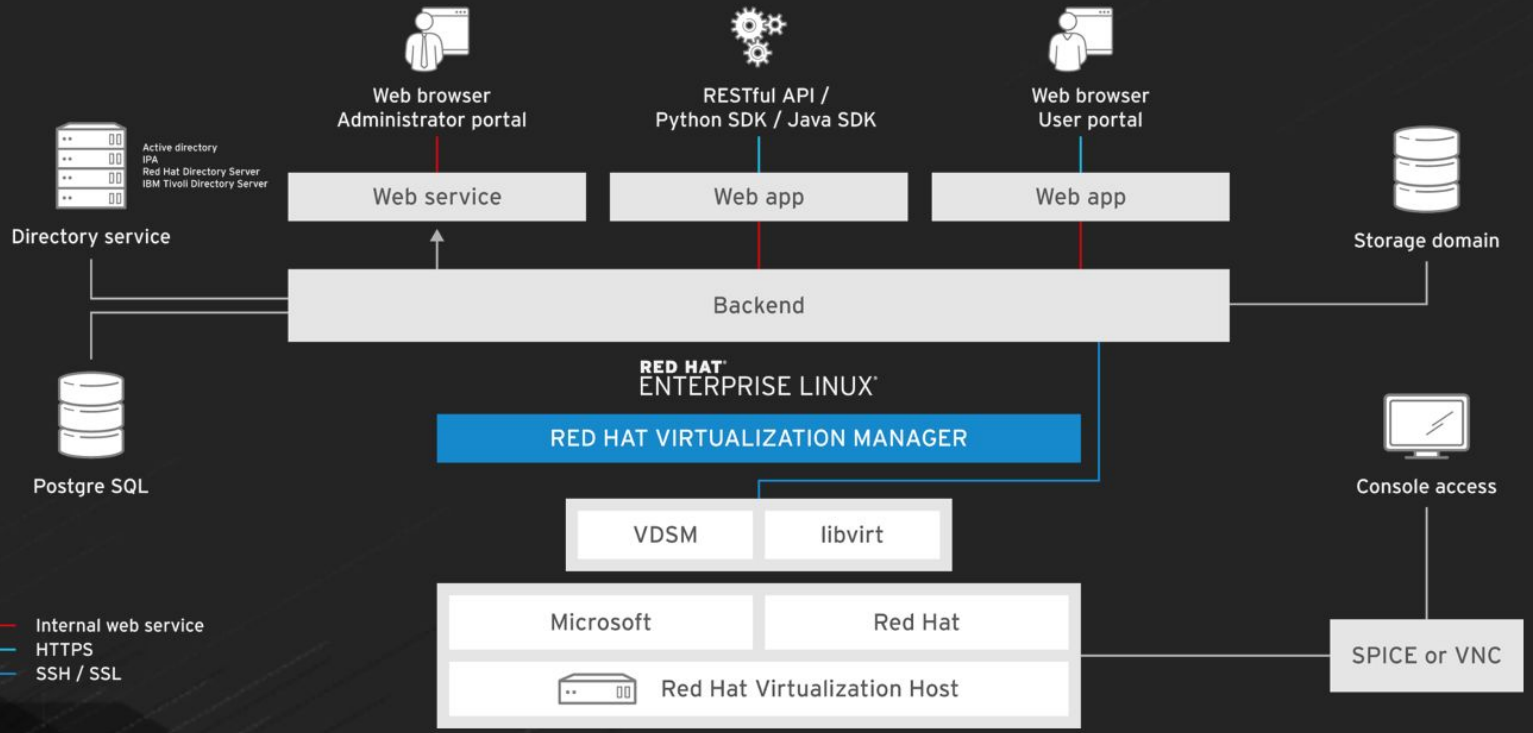
RED HAT VIRTUALIZATION OVERVIEW

- **CENTRALIZED MANAGEMENT** for the KVM hypervisor as well as compute, network, and storage resources
- **ENTERPRISE FEATURES** to support business-critical applications
- **CROSS-PORTFOLIO** integration, APIs, and SDKs to enable automation
- **RED HAT VIRTUALIZATION** is built on Red Hat Enterprise Linux+KVM



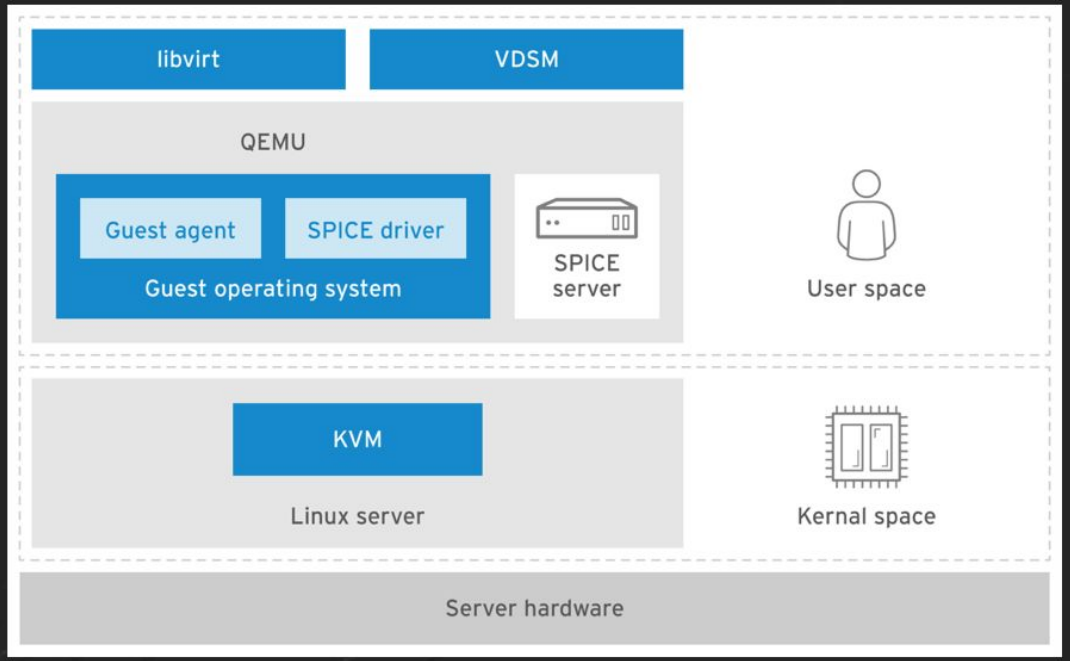
redhat.

OVERVIEW OF RED HAT VIRTUALIZATION



redhat.

KERNEL-BASED VIRTUAL MACHINE (KVM)

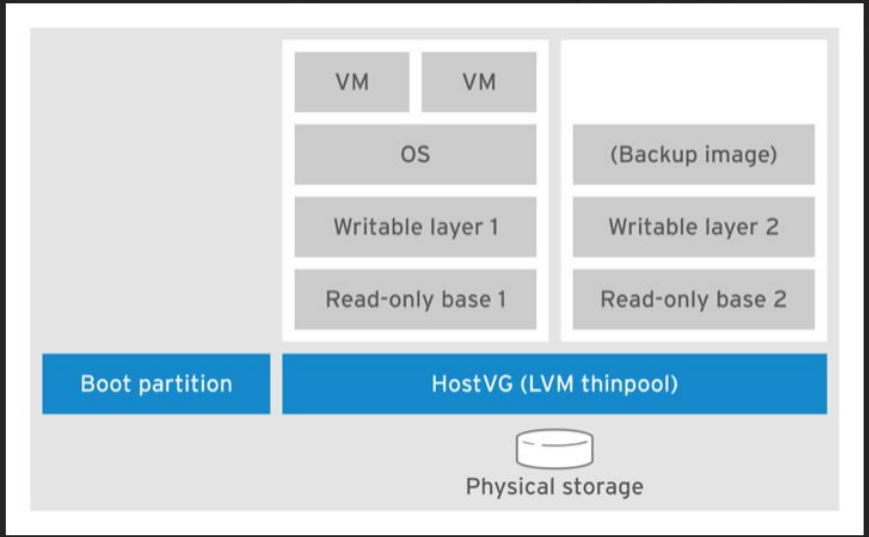


redhat.

RED HAT VIRTUALIZATION HOST

LIGHTWEIGHT HOST

- **RED HAT VIRTUALIZATION HOST**—Purpose built node built on Red Hat Enterprise Linux
- **CAN BE DEPLOYED** via ISO, PXE, USB, cloned
- **WRITABLE** root file system
- **USES TRIMMED-DOWN** Anaconda installer
- **COCKPIT** administrative console
- **SECURITY AND SERVICES** are pretuned to support virtual machines



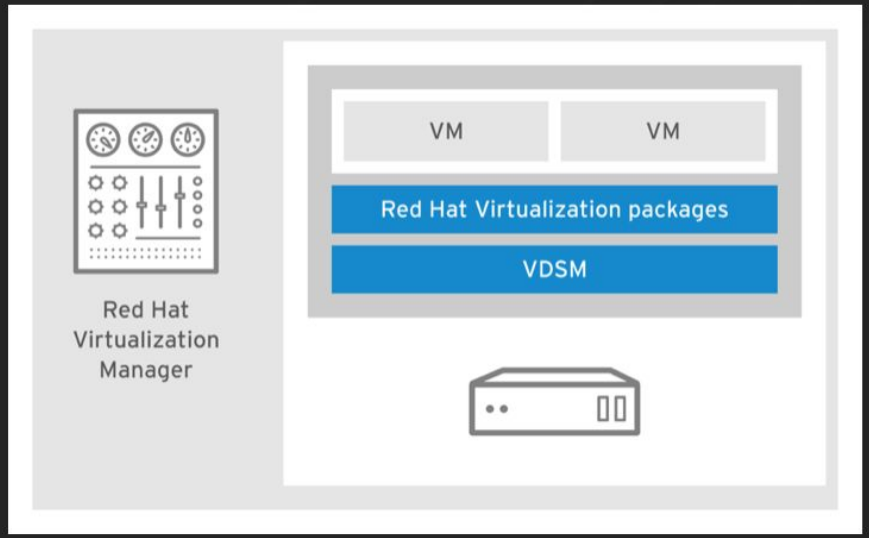
Red Hat Virtualization Host is designed around LVM Thinpools and "imgbased," resulting in a lightweight and flexible architecture.

redhat.

RED HAT ENTERPRISE LINUX NODE

FULL HOST

- **RED HAT VIRTUALIZATION 4** supports Red Hat Enterprise Linux 7 as a node
- **USES** QEMU-KVM-Red Hat Virtualization
- **LARGER FOOTPRINT** as compared to Red Hat Virtualization Host
- **RED HAT VIRTUALIZATION MANAGER** will configure security and VDSM
- **COCKPIT** needs to be manually installed and configured



Red Hat Enterprise Linux 7 is fully supported as a host in Red Hat Virtualization. Red Hat Virtualization-related packages and policies are deployed by Red Hat Virtualization Manager.

redhat.

RED HAT HYPERCONVERGED INFRASTRUCTURE 1.0

Basic features

- Single point of management for virtual resources
- CPU pinning
- RBAC and tiered access
- Power management
- VM templates
- Firewall/SELinux
- Support for Red Hat Enterprise Linux and Windows
- HA virtual machines
- Secure Browser based management
- RESTful API
- Python, Ruby, and Java SDKs
- Live migration

redhat.

RED HAT HYPERCONVERGED INFRASTRUCTURE 1.0

Advanced features

- Host affinity and anti affinity
- Migrate and import VMs
- Automated resource mgmt
- Load balancing
- CPU QoS
- Hot-add memory and CPU
- Resource reservation
- Overcommit (memory ballooning)
- Memory page sharing
- Large-page support
- Import VMs from VMware

RED HAT HYPERCONVERGED INFRASTRUCTURE 1.0

Network features

- VLAN tagging
- Network QoS
- NIC bonding
- VM-FEX support
- Open virtual network (tech preview)
- IPv6 support (guest)
- Jumbo frames
- Network labels

redhat.

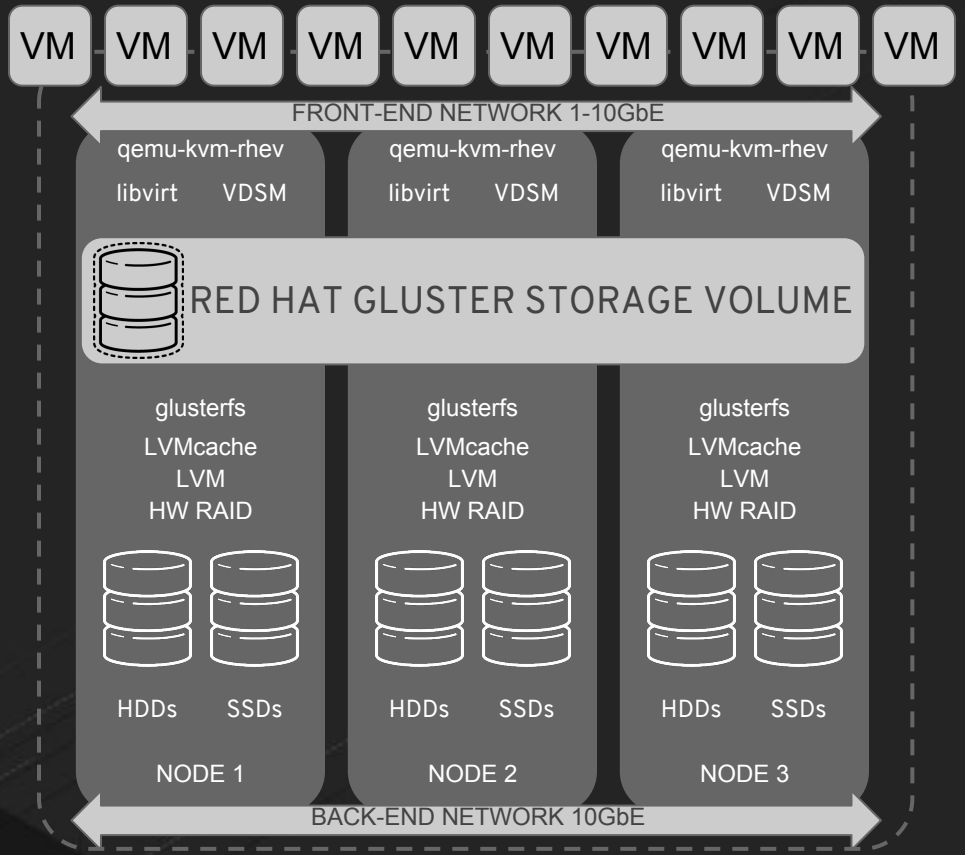
RED HAT HYPERCONVERGED INFRASTRUCTURE 1.0

Storage features

- Geo-replication
- Sharding support
- Live snapshots and merge
- Block discard
- RESTful API for backup/restore
- 3-way Data Replication
- Thin and thick provisioning
- Storage-based fencing

redhat.

RED HAT HYPERCONVERGED INFRASTRUCTURE ARCHITECTURAL VIEW - POD



3,6 or 9 Pod Configuration

redhat.

RED HAT HYPERCONVERGED INFRASTRUCTURE OR RHV + RHGS?

redhat.

RESOURCES

Red Hat Hyperconverged Infrastructure Documentation
https://access.redhat.com/products/red-hat-hyperconverged-infrastructure

All Red Hat Virtualization Documentation
https://access.redhat.com/documentation/en/red-hat-virtualization

All Red Hat Gluster Storage Documentation
https://access.redhat.com/documentation/en/red-hat-storage

redhat.

Questions ?

redhat.

redhat.

THANK YOU

plus.google.com/+RedHat

facebook.com/redhatinc

linkedin.com/company/red-hat

twitter.com/RedHatNews

youtube.com/user/RedHatVideos